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RULEMAKING ISSUE
(Notation Vote)

May 23, 1994 SECY-94-140

FOR: The Commissioners

FROM: James M. Taylor
Executive Director for Operations

SUBJECT: PROPOSED AMENDMENT TO THE NUCLEAR POWER PLANT LICENSE RENEWAL RULE (10 CFR PART 54)

PURPOSE:

To obtain Commission approval to publish a proposed revision to the nuclear power plant license renewal rule (10 CFR Part 54) and the required supporting documents.

SUMMARY:

The staff proposed, and the Commission agreed, to revise the current license renewal rule (10 CFR Part 54) to establish greater credit for existing licensee programs in the license renewal process, resolve ambiguities between the current statement of considerations (SOC) and the current rule, and establish a more efficient, stable, and predictable license renewal process.

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SECY NOTE: TO BE MADE PUBLICLY AVAILABLE AT THE JUNE 10, 1994 COMMISSION MEETING.

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The proposed rule amendment package is intended to accomplish these goals by revising the current rule and SOC as follows:

(1) Deleting the term "age-related degradation unique to license renewal" (ARDUTLR), from the rule while retaining the concept of ARDUTLR.

(2) Modifying the first principle of license renewal to reflect the deletion of the term "ARDUTLR."

(3) Modifying the scope of the systems, structures, and components that need to be considered for aging management review for license renewal.

(4) Focusing on the **effects** of aging instead of aging **mechanisms**.

(5) Determining that existing programs and activities, along with the regulatory process, for active and certain "passive" functions of structures and components are adequate to manage the effects of aging on functionality of the equipment during the period of extended operation of the plant.

(6) Determining that a renewal review which focuses on maintaining functionality of certain systems, structures, and components during the period of extended operation and a reliance on the regulatory process to address all other safety issues, will ensure that the current licensing basis (CLB) maintains an acceptable level of safety during the period of extended operation of the plant.

(7) Simplifying the integrated plant assessment (IPA) to allow a license renewal applicant flexibility to choose alternative methods to demonstrate compliance with the technical requirements of the rule.

(8) Modifying the IPA to clearly identify those structures and components that are subject to aging management review for license renewal as those structures and components that are "long-lived," "passive," and "nonredundant."

(9) Requiring that certain time-limited aging analyses be evaluated for license renewal.

(10) Making other changes to the rule consistent with allowing greater credit for existing activities and programs.

The staff proposes to publish the draft rule amendment package for a 90-day comment period and to publish a draft regulatory guide and standard review plan for license renewal approximately 6 months after issuance of a rule amendment in final form.

BACKGROUND:

In SECY-93-331, "License Renewal Workshop Results and Staff Proposals for Revision to 10 CFR Part 54, 'Requirements for Renewal of Operating Licenses for Nuclear Power Plants,'" the staff recommended initiating a rulemaking to amend the license renewal rule (10 CFR Part 54). The purpose of the proposed rulemaking would be to allow greater credit for existing licensee programs in the license renewal process, resolve ambiguities between the SOC and the rule, and establish a more efficient, stable, and predictable license renewal process.

In a staff requirements memorandum (SRM) of February 3, 1994, the Commission agreed with the staff's conceptual approach to performing license renewal reviews and directed the staff to prepare a proposed rule and an associated SOC. The Commission stated that it fully supported the principles of the current license renewal rule and the concept of ARDUTLR. The Commission also stated that it saw no reason for the term "ARDUTLR" to appear in the rule. The SRM is included as Enclosure 1.

A License Renewal Rule Steering Group and a License Renewal Rule Working Group were established to provide a focused effort to accomplish the activities associated with this rule amendment. The groups were formed because of the very ambitious schedule, as indicated in a memorandum from Mr. J. Taylor to the Commissioners, dated December 8, 1993. The Steering Group is chaired by Mr. W. Russell, Director of the Office of Nuclear Reactor Regulation (NRR), and the other members are Mr. J. Milhoan, Deputy Executive Director for Nuclear Reactor Regulation, Regional Operations and Research (DEDR), Mr. C. Heltemes, Deputy Director for Generic Issues and Rulemaking of the Office of Nuclear Regulatory Research (RES), and Mr. M. Malsch, Deputy General Counsel for Licensing and Regulation from the Office of the General Counsel (OGC). The Working Group is composed of staff from NRR, OGC, and RES.

DISCUSSION:

The staff has followed the Commission's guidance in preparing this proposed amendment to the license renewal rule. To assure a successful rule amendment, the staff established three key goals, in addition to the principal goal of safety: (1) predictability and stability, (2) simplicity and clarity, and (3) flexibility. The staff proposes to establish a more predictable and stable license renewal process by which potential applicants can better determine whether they want to pursue license renewal. The staff's proposed changes avoid terminology that has previously caused confusion, simplify the application process, and clarify which structures and components will require an aging management review for license renewal. Other changes, where appropriate, will allow a license renewal applicant flexibility to choose alternative methods to demonstrate compliance with the technical requirements of the rule.

The proposed Federal Register notice containing the rule and its (SOC) is included as Enclosure 2. A comparison of the proposed rule text vis-a-vis the current rule is shown in the table in Enclosure 5.

The following is a discussion of the major issues associated with this proposed amendment to the license renewal rule.

Principles of License Renewal

The first principle of license renewal holds that, with the exception of ARDUTLR and possibly some other issues related to safety only during the period of extended operation of nuclear power plants, the regulatory process is adequate to ensure that the licensing bases of all currently operating plants provide and maintain an acceptable level of safety so that operation will not be inimical to public health and safety or common defense and security. Moreover, consideration of the range of issues relevant only to extended operation of plants led the Commission to conclude that the detrimental effects of aging is probably the only issue generally applicable to all plants. As a result, continuing this regulatory process in the future will ensure that this principle remains valid during any period of extended operation if the regulatory process is modified to address aging unique to license renewal. Consequently, the current renewal rule focuses the Commission's review on this one safety issue but provides leeway for the Commission to address any other safety issue unique to the period of extended operation.

The second and equally important principle of license renewal holds that each plant's current licensing basis must be maintained during the period of extended operation in part through a program that manages age-related degradation of systems, structures, and components that are important to license renewal as defined in the current rule.

As stated in the SRM of February 3, 1994, the Commission continued its fundamental support of these principles. In particular, the Commission indicated its belief that mitigation of the detrimental effects of aging, which can result from the operation of the plant beyond the initial license term, is the primary issue for license renewal. The staff agrees.

The use of the term "age-related degradation unique to license renewal" (ARDUTLR) has caused significant uncertainty and a number of questions. A key problem involved how unique aging issues would be identified. For example, would existing licensee and NRC regulatory activities be considered when determining whether a component or structure is subject to ARDUTLR? The difficulty in clearly establishing "uniqueness" in connection with the effects of aging is underscored by the fact that aging is a continuing process, the fact that many licensee programs and regulatory activities are already focused on mitigating the effects of aging to ensure safety in the initial operating term of the plant, and the fact that no new aging phenomena have been identified as occurring only during the period of extended operation.

The proposed amendment to the rule eliminates both the definition and use of the term ARDUTLR from the rule language. However, the amended rule would still ensure that (1) the licensee's programs and activities, along with the regulatory process, manage the effects of aging in the period of extended

operation and (2) that aging and other issues requiring resolution for safety during the original license term are dealt with as matters outside the scope of license renewal. The amended rule will eliminate confusion regarding the detailed definition of ARDUTLR in the rule and questions regarding which equipment is subject to ARDUTLR.

With the deletion of the term ARDUTLR from the current rule, the first principle has been revised. The staff proposes the amended first principle to read as follows:

> The existing regulatory process, continued in the period of extended operation, ensures that the current licensing basis maintains an acceptable level of safety, with the possible exception of the detrimental effects of aging on the functionality of certain systems, structures, and components, and possibly some other issues related to safety only during the period of extended operation.

The staff is not proposing to revise the second principle.

Systems, Structures, and Components Within the Scope of License Renewal

The current rule contains a definition (in §54.3) of those systems, structures, and components (SSCs) important to license renewal (ITLR). As suggested by the Commission to avoid confusion, the proposed amendment removes the term "SSCs ITLR" from the rule and replaces it with a new section, §54.4 Scope, which sets forth the criteria for determining which systems, structures, and components are within the scope of the license renewal rule.

Because of confusion about the meaning of the term "required function" in the current rule, the staff proposes to replace it with the term "intended function" throughout the rule and the SOC. "Intended function" means only the function or functions that resulted in the screening of the system, structure, or component in the scope of the license renewal rule. The criteria have not been changed, except for clarifying that the focus of establishing the scope of license renewal will be only on the intended function(s) that the systems, structures, or components perform.

As indicated in SECY-93-331, the staff recommended clarifying the initial screening requirements for support systems identified by technical specification operability determinations. The staff's experience with implementing this portion of the rule has indicated that three of the four categories of systems, structures, and components within the scope of license renewal could lead to expanding the scope (cascading) to include many support systems, structures, and components. In the proposed rule, the staff has clarified the license renewal scope with respect to support systems, structures, and components. In general, an applicant for license renewal should rely on plant-specific and industry-wide operational experience and existing engineering evaluations to determine the necessary support systems, structures, and components. The scope of the technical specification category is limited to only those systems, structures, and components having technical

specification limiting conditions for operation. As previously stated in the earlier rulemaking, a consideration of hypothetical failures that might result from system interdependencies, that are not part of the current licensing basis and that have not previously been experienced, is not required.

The staff also recognizes that for some facilities, technical specifications include many systems, structures, and components that would not otherwise be included in the scope of license renewal if the improved standard technical specifications were used by that facility. Licensees have the option of modifying their technical specifications in accordance with the Commission policy statement for improved standard technical specifications. If they choose not to do so, those systems, structures, and components will be within the scope of license renewal.

Regulatory Process and Aging Management

In SECY-93-049, "Implementation of 10 CFR Part 54, 'Requirements for Renewal of Operating Licenses for Nuclear Power Plants'"; SECY-93-113, "Additional Implementation Information for 10 CFR Part 54, 'Requirements for Renewal of Operating Licenses for Nuclear Power Plants'"; and SECY-93-331, the staff endorsed, and the Commission approved in their SRM of February 3, 1994, the acceptability of performance or condition-monitoring programs to effectively manage ARDUTLR without a requirement to perform a detailed aging mechanism analyses. The staff continues to believe that regardless of the specific aging mechanism, only aging degradation that leads to degraded performance or condition (i.e., detrimental effects) is of principal concern for license renewal reviews.

As discussed in SECY-93-331, the staff believes that existing programs for structures and components that effectively manage the effects of age-related degradation during the initial license term should be credited in the license renewal process. The staff proposes to conclude that current licensee programs and activities, along with the regulatory process, will be adequate to manage the effects of aging on (1) the active functions of all equipment within the scope of license renewal and (2) the passive functions of redundant equipment within the scope of license renewal during the period of extended operation such that the CLB will be maintained. Therefore, certain structures and components will not be subject to an aging management review for license renewal, and license renewal applicants would not have to provide information in the application regarding programs or activities that manage the effects of aging of these structures and components.

To support the staff's position on relying on the regulatory process to ensure that the CLB adequately manages the effects of age-related degradation for certain structures and components, the staff developed detailed discussions in the enclosed SOC on (1) the regulatory process and development of the maintenance rule, (2) reliance on the requirements and implementation of the maintenance rule, (3) integration of the regulatory process and the maintenance rule with the license renewal rule, and (4) the maintenance rule, other regulatory requirements, and compliance with a plant's current licensing basis.

Current Licensing Basis and Maintaining the Function of Systems, Structures, and Components

This proposed rule does not alter the definition of CLB in §54.3 of the current rule, nor does it alter the discussion of CLB in the SOC associated with the current rule.

As discussed in SECY-93-331, the staff continues to believe that ensuring the intended function of a structure or a component is a sufficient basis for concluding that the CLB will be maintained throughout the period of extended operation. Although the CLB is broad and encompasses various aspects of the regulatory process, a key element of the CLB is the plant-specific design-basis information defined in 10 CFR 50.2, which states "[d]esign bases means that information which identifies the specific functions to be performed by a structure, system, or component of a facility, and the specific values or ranges of values chosen for controlling parameters as reference bounds for design." In addition, design bases identify specific functions to be performed by a system, structure, and component and design-basis values may be derived for achieving functional goals. The staff concludes that by providing reasonable assurance that the intended function of certain structures and components subject to an aging management review for license renewal will be maintained throughout the period of extended operation, along with the fact that all elements of the regulatory process and the plant's CLB carry forward into the period of extended operation, that the CLB will be maintained throughout the period of extended operation.

Integrated Plant Assessment

Based on experience gained from implementation of the license renewal rule, the staff determined that the current license renewal review would require the evaluation of a large number of plant systems, structures, and components to establish the existence of appropriate aging management activities in the period of extended operation.

Additionally, experience, further consideration of existing activities, and the requirements of the maintenance rule, have led the staff to believe that many of these systems, structures, and components are already subject to a licensee's activities to manage aging so as to ensure their intended function through any period of extended operation. Therefore, the staff proposes to amend the integrated plant assessment (IPA; 10 CFR 54.21(a)) to more efficiently focus the license renewal review on certain structures and components for which the regulatory process and existing licensee programs and activities may not adequately manage the detrimental effects of aging in the period of extended operation.

The IPA has been modified to simplify and clarify the actions an applicant will have to undertake. The IPA does not require an applicant to conduct a review or provide information on structures and components that are not determined to be subject to an aging management review. The IPA has been simplified in that an applicant will only be required to (1) discuss the

methods used to identify those structures and components subject to an aging management review and (2) demonstrate for those structures and components that the effects of aging will be managed so that the intended function(s) will be maintained for the period of extended operation.

The IPA has also been modified to provide an applicant the flexibility to choose alternative methods to identify structures and components that are subject to an aging management review for license renewal.

In SECY-93-331 and the subsequent SRM, the structures and components that are subject to further review were identified as those that are long-lived, passive, and nonredundant. The staff has further developed the meaning of the terms "long-lived," "passive," and "nonredundant" for license renewal as follows:

(1) Long-lived structures and components are those that are not subject to replacement based on a qualified life or a specified time interval. The staff intends to use this definition of "long-lived" in the rule rather than explicitly referring to the term "long-lived."

(2) Passive structures and components for license renewal are those that perform an intended function (in §54.4) without moving parts or without a change in configuration or properties, including but not limited to pressure-retaining boundaries, component supports, reactor coolant pressure boundaries, reactor vessel, core support structures, containment, seismic Category I structures, electrical cables and connections, and electrical penetrations; and excluding but not limited to pumps (except casing), valves (except body), motors, batteries, relays, breakers, and transistors.

The staff spent a considerable amount of time trying to identify a definition of "passive" for license renewal that would capture the structures and components of concern. The staff reviewed the many industry and international definitions and concepts of passive structures and components and determined that they do not accurately describe the structures and components that should be subject to an aging management review for license renewal. Accordingly, the staff has developed a description of passive characteristics of structures and components that require aging management review for inclusion in the proposed rule rather than the term "passive" and amplified with examples the type of structures and components to be included.

(3) Nonredundant structures and components for license renewal are those whose failure would result in loss of intended system or structure function. As with "long-lived" and "passive", the staff proposes to use this definition in the rule in place of an explicit use of the term "nonredundant."

Time-Limited Aging Analyses

The current rule requires the evaluation of systems, structures, and components for which time-limited aging analyses have been performed. Due in part to the deletion of ARDUTLR from the current rule and the goal to make the rule clearer, the staff proposes to evaluate those systems, structures, and components subject to time-limited aging analyses separately in the application, outside the IPA (10 CFR 54.21(c)). For the purposes of license renewal, time-limited aging analyses are those licensee calculations and analyses that form the basis for a licensee's conclusion regarding the capability of systems, structures, and components within the scope of license renewal to perform their intended function(s) that (1) consider the effects of aging and (2) are based on explicit assumptions defined by the current operating life of the plant. The staff considers the analysis to be relevant for license renewal if it provided the basis for a licensee's safety determination and, in its absence, a licensee would not have reached a safety conclusion or would have reached a different safety conclusion. This definition includes all licensee analyses that meet the above criteria whether or not these analyses were reviewed by the staff because staff reviews are often based on audits or inspections.

Experience leads the staff to believe that the number of time-limited aging analyses is relatively small. Although the number and type will vary depending on the plant-specific CLB, these analyses could include reactor vessel neutron embrittlement (pressurized thermal shock, upper-shelf energy, surveillance program), concrete containment tendon prestress, metal fatigue, environmental qualification (EQ) of electrical equipment, metal corrosion allowance, inservice flaw growth analyses that demonstrate structural stability for 40 years, and inservice local metal containment corrosion analyses.

Standards for Issuance of a Renewed License

The staff proposes to modify §54.29(a) to be consistent with the proposed elimination of the term ARDUTLR in this proposed rule. Instead of a Commission conclusion that actions have been or will be taken to address ARDUTLR, the proposed rule would have the Commission conclude that actions have been or will be taken to address (1) the detrimental effects of aging on the functionality of those structures and components determined to be subject to an aging management review through the IPA process and (2) systems, structures, and components associated with time-limited aging analyses.

The staff also proposes to add an important new section at §54.29 to clarify that issues which are identified by a license renewal review and which could result in a loss of intended function during the current term of operation will be addressed under the current license and not wait for license renewal. If at any time a question arises about the capability of a structure or a component to perform an intended function during the current term, that question must be addressed under the provisions of the current license and the current regulatory process. The staff has added this provision as §54.29(b) and has renumbered the other portions of §54.29 to help specify the bases for the Commission's license renewal finding.

Regulatory and Administrative Controls

The current license renewal rule requires an applicant to include the entire IPA in the final safety analyses report (FSAR) supplement. In SECY-93-331, the staff proposed to decouple the details of the application, especially the details of the IPA process, from the FSAR supplement based on comments received on the rule and experience with implementing the rule. The proposed rule makes a distinction between what must be included in the FSAR supplement and what can be submitted solely in the application. The proposed rule, at §54.21(d), requires that an FSAR supplement contain a summary description of those activities and programs for managing the effects of aging on functionality of certain structures and components during the period of extended operation as determined by the IPA and the time-limited aging analyses review.

The staff is also proposing to delete §54.21(b) and §54.21(d) of the current rule. Section 54.21(b) currently requires identification and justification of changes to the CLB associated with ARDUTLR, and §54.21(d) currently requires a description of any proposed plant modification necessary to ensure that ARDUTLR is adequately managed. Based on additional consideration and limited experience with the current rule, the staff believes that the current regulatory process associated with plant modification and with maintaining the CLB can be relied upon, once the changes and modifications have been identified for the period of extended operation. Relevant information concerning CLB changes and plant modifications required to demonstrate that the effects of aging on the functionality of those structures and components requiring an aging management review for the period of extended operation, and required to address time-limited aging analyses, will be discussed in the application under those sections (§54.21(a)(3) and §54.21(c), respectively). Additional regulatory controls (e.g., license conditions) can be placed under §54.33(b), if deemed necessary.

The current license renewal rule at §54.21(c) requires an applicant to provide a list of all plant-specific exemptions granted pursuant to §50.12. For those exemptions that were either granted on the basis of an assumed service life or a period of extended operation bounded by the original license term, or otherwise related to systems, structures, or components subject to ARDUTLR, an evaluation must be provided justifying the continuation of the exemption. The staff proposes to clarify the requirements for exemptions in the license renewal process. If the applicant wants the exemption to continue in the period of extended operation, the proposed rule would require an applicant to justify the continuation of exemptions that (1) were granted on the basis of an assumed explicit service life bounded by the original term and (2) concern the effects of age-related degradation. Additionally, the requirement to review and evaluate these exemptions will be included in the proposed rule as a distinct subset of time-limited aging analyses. An applicant will not be required to provide information in the application regarding exemptions that do not contain time-limited considerations or do not concern the effects of age-related degradation.

The current rule at §54.21(c) also requires an applicant to provide a similar list and justification for reliefs. Reliefs are granted pursuant to 10 CFR 50.55a and are specifically envisioned by the regulatory process. Reliefs expire after the specific 10-year, inservice inspection (ISI)/inservice testing (IST) interval and a licensee is required to rejustify the basis for the relief if it is to continue. The NRC staff then performs another review and may or may not grant the relief. Because reliefs are subject to routine periodic review, the staff believes that reliefs are adequately managed by the current regulatory process and do not require a separate detailed review and rejustification for license renewal. Therefore, the staff proposes to delete the requirement to list and evaluate reliefs.

With the removal of the term "ARDUTLR" from the rule and greater credit for existing licensee programs, the staff is proposing to modify change controls or reporting requirements in the current rule. This proposal is consistent with reliance on the regulatory process and the staff's experience that aging is continuing. The proposed rule requires that a summary description of programs and activities which ar applicant relies upon to demonstrate that the effects of aging on functionali'y of certain structures and components are or will be managed during the period of extended operation, be included in the FSAR supplement. The current regulatory process has change control and reporting requirements for information contained in the FSAR (10 CFR 50.59 and 50.71, respectively), change control requirements for technical specifications (10 CFR 50.90), and requirements in the quality assurance (QA) program. Based upon these change control and reporting requirements, §54.33(d) and 54.37(c) of the current license renewal rule have been removed from the proposed rule.

Environmental Assessment

The SOC for the proposed rule indicates that the NRC has made a preliminary determination that the amendment to this rule (10 CFR Part 54), if adopted, would not be a major Federal action significantly affecting the quality of the human environment and that an environmental impact statement is not required. The draft environmental assessment on which this determination is based is presented in Enclosure 3.

Regulatory Analyses

A regulatory analyses of the benefits and costs of the proposed amendment to the rule and of two alternatives is presented in Enclosure 4. The three alternatives analyzed and compared are (a) use of the current rule as it is without any amendment, (b) focusing on the management of the effects of aging on the functionality of certain "long-lived," "passive" structures and components and systems, structures, and components with time-limited aging analyses, and (c) focusing only on systems, structures, and components with time-limited aging analyses. The alternative selected is expected to provide a level of safety similar to the current rule at reduced cost.

Paperwork Burden

The analytical and paperwork burden that the proposed amendment to the rule would impose on potential applicants is expected to vary widely. The cost analyses performed as part of the regulatory analyses led to an estimated average of 94,000 staff-hours per plant; this figure represents a reduction of over 30 percent from the estimate used for the current rule. This figure is stated in the SOC for the proposed rule and will be reflected in the Office of Management and Budget (OMB) Paperwork Reduction Act Clearance Package to be submitted to OMB.

Other Issues

The current license renewal rule at §54.17(c) states that an application for a renewed license may not be submitted earlier than 20 years before the expiration of the current operating license. The Commission concluded in the SOC for the current license renewal rule that 20 years of operational and regulatory experience provide a licensee with substantial amounts of information and would disclose any plant-specific concerns with regard to age-related degradation. In addition, a license renewal decision with approximately 20 years remaining on the operating license would be reasonable considering the estimated time necessary for utilities to plan for replacement of retired nuclear power plants. One utility has recently indicated that decisions regarding license renewal made earlier in the current license term may create substantial current-day economic advantages while still providing sufficient plant-specific history and has suggested that the earliest date for filing a license renewal application be changed so that a license renewal application can be submitted earlier than 20 years before expiration of the existing operating license. The term of the renewed license would still be limited to 40 years. The staff is considering changing this 20-year limit and is proposing to ask questions in the Federal Register notice in this regard.

In SECY-94-004, "Plan for Implementing Regulatory Review Group Recommendations," the staff committed to rethink the definition of CLB contained in §54.3 for possible modification and subsequent incorporation into the definition in Part 50. Completion of this task was to coincide with completion of this proposed license renewal rulemaking. The review, possible modification, and incorporation of the definition of CLB into Part 50 are not part of this proposed rule package. The staff is evaluating the CLB issue separately from this proposed amendment to the license renewal rule. The CLB issue is part of an activity that NRR is conducting with the industry to develop a commitment tracking system. The results of this effort will be reported separately and should not affect this rule amendment.

Schedule:

The proposed amendment to the nuclear power plant license renewal rule (10 CFR Part 54) and its supporting documents are expected to be published for a 90-day comment period in the Federal Register within 1 month after the Commission's approval. A final rulemaking is scheduled to be forwarded to the Commission for its review and approval approximately 5 months after the close of the comment period for the proposed rule.

Developing and publishing the regulatory guide and the standard review plan for license renewal are also important to further ensure a stable and predictable license renewal process. However, the staff's priority is to expeditiously complete this proposed rule. The staff now plans to revise and publish the regulatory guide and the standard review plan for license renewal as drafts for public comment approximately 6 months after publication of the final amendment to 10 CFR Part 54. Additionally, the staff is planning to conduct a public workshop on the regulatory guide and the standard review plan for license renewal.

RESOURCES:

There are sufficient resources in the NRC's FY 1995 budget request to Congress to complete the proposed amendment to the license renewal rule and to develop the associated regulatory guidance and standard review plan. Resources to implement the final rule and the associated regulatory guidance will be addressed in the NRC Five-Year Plan for FY 1995-1999.

COORDINATION:

The Office of the General Counsel has reviewed the proposed rule and has no legal objection to it.

RECOMMENDATIONS:

That the Commission:

1. Approve the proposed rule (Enclosure 2) for publication in the Federal Register for a 90-day comment period.

2. Certify that this rule does not have a significant economic impact on a substantial number of small entities in order to satisfy the requirements of the Regulatory Flexibility Act (5 U.S.C. 605(b)).

3. Note:

(a) That unless the Commission directs otherwise, within three working days from the date of this paper, the staff will release this paper to the public.

(b) That a draft regulatory analysis has been prepared for this rulemaking action (Enclosure 4).

(c) That a draft environmental assessment and finding of no significant impact has been prepared for this rulemaking action (Enclosure 3).

(d) That the Subcommittee on Nuclear Regulation of the Senate Committee on Environment and Public Works, the Subcommittee on Energy and Power of the House Committee on Energy and the Environment of the House Committee on Interior and Insular Affairs will be informed of this rulemaking action.

(e) That the proposed rule amends information collection requirements subject to the Paperwork Reduction Act. These requirements will be submitted to the Office of Management and Budget for review and approval.

(f) That the Chief Counsel for Advocacy of the Small Business Administration will be informed of the certification and the reasons for it as required by the Regulatory Flexibility Act.

(g) That a public announcement will be issued and that a copy of the proposed rule will be distributed to all affected licensees and other interested persons.

(h) The staff will conduct a public workshop on the regulatory guide and the standard review plan for license renewal.

(i) The staff currently plans to brief the Advisory Committee on Reactor Safety (ACRS) during its June meeting. The staff understands that the ACRS should be able to provide comments to the Commission shortly thereafter in time to support the Commission's decision on publishing the proposed rule.

(j) To help the staff meet its aggressive schedule, the Committee to Review Generic Requirements (CRGR) agreed to review the proposed rule after it has been published for public comment, rather than before it is submitted to the Commission.

James M. Taylor
Executive Director
for Operations

Enclosures:
1. Staff Requirements Memorandum of February 3, 1994
2. Federal Register notice (proposed rule with SOC)
3. Environmental Assessment
4. Regulatory Analyses
5. Table Comparing the Current Rule and the Proposed Rule

Commissioners' comments or consent should be provided directly to the Office of the Secretary by COB June 17, 1994.

Commission Staff Office comments, if any, should be submitted to the Commissioners NLT June 9, 1994, with an information copy to the Office of the Secretary. If the paper is of such a nature that it requires additional review and comment, the Commissioners and the Secretariat should be apprised of when comments may be expected.

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Enclosure 1

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555

OFFICE OF THE
SECRETARY

February 3, 1994

MEMORANDUM TO: James M. Taylor
Executive Director for Operations

FROM: Samuel J. Chilk, Secretary

SUBJECT: SECY-93-331 - LICENSE RENEWAL WORKSHOP RESULTS AND STAFF PROPOSALS FOR REVISION TO 10 CFR PART 54, "REQUIREMENTS FOR RENEWAL OF OPERATING LICENSES FOR NUCLEAR POWER PLANTS"

The Commission (with all Commissioners agreeing) agrees with the staff's conceptual approach to performing license renewal reviews. The Commission agrees that a detailed Statement of Considerations (SOC) should be developed providing the bases for the revised rule and changes from the original rule. The Commission also believes that the revised rule should be simplified.

In this regard, the staff should prepare a SOC and rule that reflect the following points:

The Commission believes it is appropriate for the focus of license renewal to be the management of the effects of aging on important SSCs during the period of extended operation (as defined in the current rule) since this is the best means for ensuring they function as intended. The previous indications in the Part 54 SOC that there should be an identification and evaluation of aging mechanisms prior to license renewal could constitute an open-ended research project, and in the long run may not ensure the function of important SSCs.

The Commission fully supports the principles provided in the SOC of the original license renewal rule. In particular, the Commission believes the existing regulatory process, continued in the period of extended operation, ensures the CLB maintains an acceptable level of safety with the possible exception of detrimental effects of aging on the functionality of certain SSCs

SECY NOTE: THIS SRM, SECY-93-331, AND THE VOTE SHEETS OF ALL COMMISSIONERS WILL BE MADE PUBLICLY AVAILABLE 10 WORKING DAYS FROM THE DATE OF THIS SRM

during the period of extended operation. This is the concept of age related degradation unique to license renewal (ARDUTLR) in the current rule. However, the term ARDUTLR has resulted in confusion about the Commission's intended focus for license renewal. Therefore, the Commission sees no reason that the term ARDUTLR need appear in the Part 54 rule itself. The SOC should state as clearly and as succinctly as possible the rationale for selection of those SSCs which must be reviewed for the extended period, and why others are excluded. The SOC would explain that those SSCs which are to be the subject of renewal review are limited to those SSCs which may require additional assurance that the CLB for these SSCs will be maintained during the extended period. Existing licensee maintenance activities (e.g., replacement, refurbishment, etc) maintain functionality by managing aging effects, and licensee monitoring activities associated with implementation of the maintenance rule will continue throughout the renewal period. The SOC should explain the connection between CLB compliance and functionality, and conclude that therefore, the only important SSCs that need to be reviewed for the extended period of operation are: 1) certain long-lived passive SSCs (as described in SECY-93-331), and 2) those SSCs which have explicit time-limited safety analyses. These SSCs could be referred to as "reviewable SSCs" or some other suitable term.

The important objective for the rule is to identify reviewable SSCs and to ensure their functionality in the period of extended operation by ensuring the management of aging effects. The rule should be simplified to identify the categories of SSCs that need to be reviewed for the extended period. The Commission envisions that the staff would retain the integrated plant assessment process, clearly identify that the principal emphasis for license renewal technical evaluation is on important passive long-lived structures and components and on issues relating to SSCs whose safety was premised on explicit time-limited analyses, and clearly identify where we will rely on existing programs, including the maintenance rule. It would still be the responsibility of the licensee to perform the IPA to identify those SSCs that require further technical evaluation and those SSCs which are covered by existing programs.

In addition to the above matters, the staff should give special emphasis to the following when preparing the SOC and the proposed rule:

(1) avoid use of such terms as "ITLR function" and be as specific as possible as to what SSCs the staff will look at for license renewal and for what SSCs the staff will rely on existing programs.

(2) provide a consistent rationale for referring to SCs as opposed to SSCs.

(3) ensure that the approach the staff uses permits the finding to be made that the CLB will be maintained during the period of extended operation for the reviewable SSCs.

The staff, upon preparing the proposed rule and SOC, should forward the proposed rulemaking package to the Commission for review and approval prior to publication.
(EDO) (SECY Suspense: 5/27/94)

cc: The Chairman
Commissioner Rogers
Commissioner Remick
Commissioner de Planque
OGC
OCA
OIG
Office Directors, Regions, ACRS, ACNW, ASLBP (via E-Mail)

Enclosure 2

ENCLOSURE 2

[7590-01-P]

NUCLEAR REGULATORY COMMISSION

10 CFR Parts 2, 51 and 54

RIN 3150-AF05

Nuclear Power Plant License Renewal; Proposed Revisions

AGENCY: Nuclear Regulatory Commission.

ACTION: Proposed rule.

SUMMARY: The Nuclear Regulatory Commission (NRC) is proposing to amend its regulations to change the requirements that an applicant for renewal of a nuclear power plant operating license must meet, clarify the required information that must be submitted to the NRC for review so that the agency can determine whether those requirements have in fact been met, and change the administrative requirements that a holder of a renewed license must meet. The proposed amendments are intended to provide a more stable and predictable regulatory process for license renewal. This proposed rule would inform nuclear power plant licensees and interested members of the public of the proposed changes to the regulatory requirements for extending nuclear power plant operating licenses beyond 40 years.

DATES: Submit comments by (90 days after publication in the Federal Register). Comments received after this date will be considered if it is practical to do so, but the Commission is able only to ensure consideration for comments received on or before this date.

ADDRESSES: Send comments to: Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555, Attention: Docketing and Service Branch.

Deliver comments to: One White Flint North, 11555 Rockville Pike, Rockville, Maryland 20852, between 7:45 am and 4:15 pm Federal workdays.

Copies of comments received may be examined at: NRC Public Document Room, 2120 L Street NW. (Lower Level), Washington, DC.

FOR FURTHER INFORMATION CONTACT: Thomas G. Hiltz, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555, telephone: (301) 504-1105.

SUPPLEMENTARY INFORMATION:

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I. Background.

The license renewal rule (10 CFR Part 54) was adopted by the Commission on December 13, 1991 (56 FR 64943). This rule established the procedures, criteria, and standards governing the renewal of nuclear power plant operating licenses.

Since publishing the license renewal rule, the staff of the U.S. Nuclear Regulatory Commission (NRC) has conducted various activities related to implementing this rule, including developing a draft regulatory guide and a draft standard review plan (SRP) for license renewal, interacting with lead plant licensees, and reviewing generic industry technical reports sponsored by the Nuclear Management and Resources Council (now part of the Nuclear Energy Institute).

In November 1992, the law firm of Shaw, Pittman, Potts, and Trowbridge submitted a paper to the NRC that presented Northern States Power Company's perspectives on the license renewal process. The paper included specific recommendations for making the license renewal process more workable. In addition, industry representatives provided the Commission with views on several key license renewal implementation issues. In late 1992, the NRC staff conducted a senior management review and interacted with the Commission, industry groups, and individual licensees to discuss key license renewal issues. The NRC staff discussed its recommendations regarding several of these key license renewal issues in two recent Commission policy papers (SECY-93-049, "Implementation of 10 CFR Part 54, 'Requirements for Renewal of Operating Licenses for Nuclear Power Plants,'" and SECY-93-113, "Additional

Implementation Information for 10 CFR Part 54, 'Requirements for Renewal of Operating Licenses for Nuclear Power Plants'").

In its staff requirements memorandum (SRM) of June 28, 1993, the Commission indicated that a predictable and stable regulatory process that defines the Commission's expectations for license renewal in a clear and unequivocal way is essential. This would permit licensees to make decisions about license renewal without these decisions being influenced by a regulatory process that is perceived to be uncertain, unstable, or not clearly defined. The Commission directed the NRC staff to convene a public workshop to evaluate alternative approaches for license renewal that best take advantage of existing licensee activities and programs as a basis for concluding that aging will be addressed in an acceptable manner during the period of extended operation. In particular, the Commission directed the NRC staff to examine the extent to which greater reliance can be placed on the maintenance rule (10 CFR 50.65, Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants) as a basis for concluding that the effects of aging will be effectively managed during the license renewal term.

On September 30, 1993, the NRC staff conducted a public workshop in Bethesda, Maryland, that was attended by over 180 representatives from nuclear utilities, industry organizations, architect and engineering firms, consultants and contractors, and Federal and State governments. In December 1993, the NRC staff forwarded SECY-93-331, "License Renewal Workshop Results and Staff Proposals for Revision to 10 CFR Part 54, 'Requirements for Renewal of Operating Licenses for Nuclear Power Plants,'" to the Commission. The NRC staff recommended that the Commission direct it to amend 10 CFR Part 54 to establish a more stable and predictable license renewal process.

In its SRM of February 3, 1994, the Commission agreed with the NRC staff's conceptual approach in SECY-93-331 for performing license renewal reviews and directed the staff to proceed with rulemaking to amend 10 CFR Part 54. The Commission believes that the license renewal process should focus on the management of the effects of aging on certain systems, structures, and components during the period of extended operation. An objective for the proposed amendment is to establish a more stable and predicable license renewal process that identifies certain structures and components that require an aging management review to provide the necessary assurance that these structures and components will continue to perform their intended function for the period of extended operation.

II. Proposed Action.

The proposed rule would revise certain requirements contained in 10 CFR Part 54 and establish a regulatory process that is simpler, more stable, and more predictable than the current license renewal rule. The proposed rule would continue to ensure that continued operation beyond the term of the original operating license will not be inimical to the public health and safety. The more significant proposed changes to the license renewal rule are as follows:

(1) The intent of the license renewal review would be clarified to focus on the adverse effects of aging. This change would ensure that important structures and systems will continue to perform their intended function in the period of extended operation. Identification of individual aging mechanisms would not be required as part of the renewal review. The

definitions of *age-related degradation*, *age-related degradation unique to license renewal*, *aging mechanisms*, *renewal term*, and *effective program* would be deleted.

(2) The definition of *integrated plant assessment* (IPA) (§54.3) and the IPA process (§54.21(a)) would be clarified to be consistent with the revised focus in item (1) on the detrimental effects of aging.

(3) A new §54.4 would be added to replace the current definition of systems, structures, and components "important to license renewal" in §54.3. Section 54.4 would define those systems, structures, and components within the scope of the license renewal rule and would identify the important functions (intended functions) of the systems, structures, and components that must be maintained.

(4) In §54.21(a), the IPA process would be simplified. The wording would be changed to resolve any ambiguity associated with the use of the terms systems, structures, and components (SSCs) and structures and components (SCs). A simplified methodology for determining whether a structure or component requires an aging management review for license renewal would be delineated. Only certain long-lived, passive equipment would be subject to an aging management review for license renewal. Sections 54.21(b) and (d) of the current rule would be deleted, and a new §54.21(c) dealing with time-limited analyses and a new §54.21(d) dealing with final safety analysis report (FSAR) supplement requirements would be added. The requirement to review any relief from codes and standards contained in §54.21(c) of the current rule would be deleted, and the requirement to review exemptions from regulatory requirements contained in §54.21(c) of the current rule would be clarified and linked with the time-limited analyses.

(5) In §54.22, the requirement to include technical specification changes in the FSAR supplement would be clarified consistent with the revised focus on the detrimental effects of aging.

(6) In §54.29, the standards for issuance of a renewed license would be changed to reflect the revised focus on the detrimental effects of aging concerning structures and components requiring an aging management review for license renewal and any time-limited issues (including exemptions) applicable for the renewal term. A new paragraph (b) would be added to separate those issues identified during the license renewal process that require resolution during the current license term from those issues that require resolution during the license renewal process.

(7) In §54.33, requirements for continuation of the current licensing basis (CLB) and conditions of renewed licenses would be changed to delete all reference to age-related degradation unique to license renewal (ARDUTLR). Section 54.33(d) of the current rule, which requires a specific change control process, would be deleted.

(8) In §54.37, additional records and recordkeeping requirements would be changed to be less prescriptive. Section 54.37(c) would be deleted.

A set of questions, which is included in Section V of this statement of considerations (SOC), identifies certain issues considered in the development of the proposed rule for which the Commission is soliciting additional information from members of the public.

III. Principal Issues.

a. Continued validity of certain findings in previous rulemaking.

The purpose of this proposed rule is to simplify and clarify the current license renewal rule. As such, it is a narrowly circumscribed rulemaking. Unless otherwise clarified or reevaluated, either directly or indirectly, in the discussion for this proposed rule, the conclusions in the SOC for the current license renewal rule remain valid (56 FR 64943; December 13, 1991). Therefore, if any conflicts arise between discussions in the SOC for the December 13, 1991, license renewal rule and discussions in the justification for this proposed rule that follow, the intent discussed in the justification for this proposed rule should take precedent.

b. Reaffirmation of the regulatory philosophy and approach and clarification of the two principles of license renewal.

(i) Regulatory philosophy.

In developing the current license renewal rule, the Commission concluded that issues that are material to renewal of a nuclear power plant operating license are to be confined to those issues that the Commission determines are uniquely relevant to protecting the public health and safety and preserving common defense and security during the period of extended operation. Other issues would, by definition, have a relevance to the safety and security of the public during current plant operation. Given the Commission's ongoing

obligation to oversee the safety and security of operating reactors, issues that are relevant to current plant operation will be addressed within the present license term rather than deferred until the time of renewal. Consequently, the Commission formulated the following two principles of license renewal.

The first principle of license renewal was that, with the exception of age-related degradation unique to license renewal and possibly some few other issues related to safety only during extended operation of nuclear power plants, the regulatory process is adequate to ensure that the licensing bases of all currently operating plants provide and maintain an acceptable level of safety so that operation will not be inimical to public health and safety or common defense and security. Moreover. consideration of the range of issues relevant only to extended operation led the Commission to conclude that the detrimental effects of aging is probably the only issue generally applicable to all plants. As a result, continuing this regulatory process in the future will ensure that this principle remains valid during any period of extended operation if the regulatory process is modified to address age-related degradation that is of unique relevance to license renewal. Consequently, the current license renewal rule focuses the Commission's review on this one safety issue. Under the current rule, the Commission may address any other safety issue unique to the period of extended operation.

The second and equally important principle of license renewal holds that the plant-specific licensing basis must be maintained during the renewal term in the same manner and to the same extent as during the original licensing term. This principle would be accomplished, in part, through a program of

age-related degradation management for systems, structures, and components that are important to license renewal as defined in the current rule.

The Commission continues its fundamental support for these principles. In particular, the Commission still believes that mitigation of the deleterious effects of aging resulting from operation beyond the initial license term should be the focus for license renewal. After further consideration and experience in implementing the current rule, the Commission has, however, determined that the requirements for carrying out the license renewal review can and should be simplified and clarified. The Commission has concluded that, for certain plant equipment, the existing regulatory process will continue to mitigate the effects of aging to provide an acceptable level of safety in the period of extended operation.

The Commission now believes that it can generically exclude from aging management review for license renewal (1) those structures and components, or portions thereof, which perform active functions, (2) structures and components subject to replacement based on qualified life or specified time period, and (3) structures or components whose failure will not prevent the satisfactory accomplishment of an intended function as described in §54.4. The objective of a license renewal aging management review is to determine whether the detrimental effects of aging could adversely affect the functionality of systems, structures, and components that the Commission determines require review for the period of extended operation. The aging management review is intended to identify any additional actions that will be needed to maintain the functionality of this equipment in the period of extended operation. Detailed discussions concerning determination of those

structures and components requiring an aging management review are contained in Section III.C and Section III.f of this SOC, respectively.

Accordingly, this proposed rule focuses the license renewal aging management review on certain equipment that the Commission has determined requires evaluation to ensure that the effects of aging will be managed adequately in the period of extended operation. This change is viewed as a modification consistent with the first principle of license renewal established in the current rule. In view of this proposed rule, the first principle can be revised to state that, with the possible exception of the detrimental effects of aging on the functionality of certain plant equipment in the period of extended operation and possibly some other issues related to safety only during extended operation, the regulatory process is adequate to ensure that the licensing bases of all currently operating plants provide and maintain an acceptable level of safety so that operation will not be inimical to public health and safety or common defense and security.

(ii) Deletion of the term "Age-Related Degradation Unique to License Renewal."

The use of the term "age-related degradation unique to license renewal" (ARDUTLR) has caused significant uncertainty. A key problem involves how unique aging issues are to be identified and, in particular, how existing licensee activities and Commission regulatory activities are to be considered in the identification of systems, structures, and components as either subject to or not subject to ARDUTLR. The difficulty in clearly establishing "uniqueness" in connection with the effects of aging is underscored by the

fact that aging is a continuing process, the fact that many licensee programs and regulatory activities are already focused on mitigating the effects of aging to ensure safety in the current operating term of the plant, and the fact that no new aging phenomena have been identified as potentially occurring only during the period of extended operation.

The proposed rule would eliminate both the definition of ARDUTLR and use of the term in codified regulatory text. Confusion regarding the detailed definition of ARDUTLR in the rule and questions regarding which equipment could be subject to ARDUTLR would be eliminated. Specifically, the proposed rule would focus on ensuring that the effects of aging in the period of extended operation are adequately managed.

Under the current rule, time-limited aging analyses applicable to systems, structures, and components important to license renewal that were based either on an explicitly assumed service life or defined by the current license term and were the basis for a safety analysis, are considered subject to ARDUTLR. Because the proposed amendment would delete the definition of "ARDUTLR," the proposed rule would explicitly identify time-limited aging analyses as requiring evaluation as part of the renewal process. Time-limited aging issues are discussed further in Section III.g of this SOC.

c. Systems, structures, and components within the scope of license renewal.

(i) Scope and intended functions.

In the proposed rule, the Commission has deleted the definition of *systems, structures, and components important to license renewal* and replaced it with a new section entitled **§54.4 Scope**. This section defines the set of plant systems, structures, and components that would be the focus of the license renewal review. In addition, this new section clarifies that functional requirements are the bases for identifying the scope of equipment to be considered for license renewal. From this set of systems, structures, and components, an applicant for license renewal will determine those structures and components that would require an aging management review for license renewal. The Commission continues to believe that the initial scoping for the license renewal review should not be limited to only those systems, structures, or components that the Commission has traditionally defined as safety related. The intent of the definition of *systems, structures, and components important to license renewal* (i.e., to initially focus the review on important systems, structures, and components) remains intact in the proposed §54.4.

The current license renewal rule requires an applicant for license renewal to identify from the systems, structures, and components important to license renewal (ITLR) those structures and components that contribute to the performance of a "required function" or could, if they fail, prevent systems, structures, and components from performing a "required function." This

requirement initially posed some difficulty in implementation because it was not clear what was meant by "required function." Most systems, structures, and components have more than one function and each could be regarded as "required." Although the Commission could have required a licensee to ensure all functions of a system, structure, or component as part of the aging management review, the Commission concluded that this requirement would be unreasonable and inconsistent with the Commission's original intent to focus only on those systems, structures, and components of primary importance to safety. Consideration of ancillary functions would expand the scope of the license renewal review beyond the Commission's intent. Therefore, the Commission determined that "required function" in the current license renewal rule refers to those functions that are responsible for causing the systems, structures, and components to be considered important to license renewal.

To avoid any confusion with the current rule, the Commission has changed the term "required function" to "intended function" and explicitly stated in §54.4 that the intended functions for systems, structures, and components are the same functions that define the systems, structures, and components as being within the scope of the proposed rule.

(ii) Bounding the scope of review.

Experience with implementing the current license renewal rule has indicated that the description of systems, structures, and components subject to an aging management review could be broadly interpreted and result in an unnecessary expansion of the review. To limit the potential for an unnecessary expansion of the review associated with the scoping criterion

relating to nonsafety-related systems, the Commission intends this proposed nonsafety-related category to apply to systems, structures, and components whose failure would prevent the accomplishment of an intended function of a safety-related system, structure, and component. An applicant for license renewal should rely on the plant's current licensing bases, actual plant-specific experience, industry-wide operating experience, and existing engineering evaluations. Consideration of hypothetical failures that could result from system interdependencies, that are not part of the current licensing bases and that have not been previously experienced is not required.

To limit the potential for unnecessary expansion of the review for those systems, structures, and components whose function is relied upon in certain plant safety analyses to demonstrate compliance with the Commission's regulations (i.e., environmental qualification, station blackout, anticipated transient without scram, pressurized thermal shock, and fire protection), the Commission intends that this scoping category include all systems, structures, and components whose function is relied upon to demonstrate compliance with the Commission's regulations. An applicant for license renewal should rely on the plant's current licensing bases, actual plant-specific experience, industry-wide operating experience, and existing engineering evaluations. Consideration of hypothetical failures that could result from system interdependencies, that are not part of the current licensing bases and that have not been previously experienced is not required.

Finally, regarding the review for the technical specification scoping category, the Commission intends that an applicant for license renewal identify only those systems, structures, and components that are necessary for operability of the system, structure, or component having technical

specification limiting conditions for operation (LCOs). Consideration of hypothetical failures that have not been previously experienced and that have not been explicitly evaluated as part of the current licensing basis, that could result in entry into a technical specification LCO is not required.

d. The regulatory process and aging management.

(i) Aging mechanisms and effects of aging.

The current license renewal review approach discussed in the SOC accompanying the December 13, 1991, rule emphasized the identification and evaluation of aging mechanisms for structures, systems, and components within the scope of the rule. Primarily through pre-application implementation experience associated with the current license renewal rule and the evaluation of comments resulting from the September 1993 license renewal workshop, the Commission determined that an approach to license renewal that focuses only on the identification and evaluation of aging mechanisms could constitute an open-ended research project. Ultimately, this type of approach may not provide reasonable assurance that certain systems, structures, and components will continue to perform their intended functions. The Commission believes that regardless of the specific aging mechanism, only aging degradation that leads to ***degraded performance or condition (i.e., detrimental effects)*** is of principal concern for license renewal reviews. Because the detrimental effects of aging are manifested in degraded performance or condition, an appropriate license renewal review would ensure that licensee programs adequately monitor performance or condition in a manner that allows for the

timely identification and correction of degraded conditions. The Commission concludes that a shift in focus to ***managing the detrimental effects of aging*** for license renewal reviews is appropriate and will provide reasonable assurance that systems, structures, and components are capable of performing their intended function during the period of extended operation.

This shift in focus of the license renewal review has resulted in several proposed changes to the license renewal rule. These changes include deleting the definitions of ***aging mechanism*** and ***age-related degradation***, and replacing the references to managing ARDUTLR in the IPA with a requirement to demonstrate that the effects of aging will be adequately managed for the period of extended operation.

(ii) Regulatory requirements and reliance on the regulatory process for managing the effects of aging.

The Commission amended its regulations on July 10, 1991 (56 FR 31306), to require commercial nuclear power plant licensees to monitor the effectiveness of maintenance activities for safety-significant plant equipment to minimize the likelihood of failures and events caused by the lack of effective maintenance. The maintenance rule and its implementation guidance (1) provides for continued emphasis on the defense-in-depth principle by including selected balance-of-plant (BOP) systems, structures, and components, (2) integrates risk consideration into the maintenance process, (3) provides an enhanced regulatory basis for inspection and enforcement of BOP maintenance-related issues, and (4) provides a strengthened regulatory basis for ensuring that the progress achieved to date is sustained in the future.

The requirements of the maintenance rule must be implemented by each licensee by July 10, 1996.

Commercial nuclear power plants have been performing a variety of maintenance activities that function effectively as aging management programs since plants were initially constructed. The Commission also recognizes that both the industry and the NRC have acquired extensive experience and knowledge in the area of nuclear power plant maintenance. Regarding the need for a maintenance rule, the results of the Commission's Maintenance Team Inspections (MTIs) indicated that licensees have adequate maintenance programs in place and have exhibited an improving trend in implementing them (56 FR 31307; July 10, 1991). However, the Commission determined that a maintenance rule was needed, in part because the MTIs identified some common maintenance-related weaknesses, such as inadequate root-cause analysis leading to repetitive failures, lack of equipment performance trending, and lack of appropriate consideration of plant risk in the prioritization, planning, and scheduling of maintenance.

Since publishing the license renewal rule on December 13, 1991, the regulatory process (e.g., regulatory requirements, aging research, inspection requirements, and inspection philosophy) for managing the detrimental effects of aging for important systems, structures, and components has continued to evolve. The changes in the regulatory process and initial experience with the license renewal rule have had a direct bearing on the Commission's conclusions regarding the appropriate focus of aging management review for systems, structures, and components that are within the scope of the license renewal rule, and how these systems, structures, and components are treated in the IPA process.

In June 1993, the NRC issued Regulatory Guide 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." The regulatory guide provides an acceptable method for complying with the requirements of the maintenance rule and states that a licensee can use alternative methods if the licensee can demonstrate that these alternative methods satisfy the requirements of the rule. Because aging is a continuing process, the Commission has concluded that existing programs and regulatory requirements that continue to be applicable in the period of extended operation and provide adequate aging management for systems, structures, and components should be credited for license renewal. Accordingly, the proposed amendment to the license renewal rule would focus the renewal review on plant equipment for which current activities and requirements may not be sufficient to manage the effects of aging in the period of extended operation.

(iii) Maintenance rule requirements and implementation.

As discussed in the regulatory analysis for the maintenance rule and in Regulatory Guide 1.160, the Commission's determination that a maintenance rule was needed arose from the conclusion that proper maintenance was essential to plant safety. A clear link exists between effective maintenance and safety as it relates to factors such as the number of transients and challenges to safety systems and the associated need for operability, availability, and reliability of safety equipment. In addition, good maintenance is important to providing assurance that failures of other than safety-related systems, structures, and components that could initiate or adversely affect a transient or accident are minimized. Minimizing challenges to safety systems is

consistent with the Commission's defense-in-depth philosophy. Therefore, nuclear power plant maintenance is clearly important to protecting the public health and safety.

The maintenance rule requires that power reactor licensees monitor the performance or condition of systems, structures, and components against licensee-established goals in a manner sufficient to provide reasonable assurance that these systems, structures, and components are capable of fulfilling their intended functions. Where it can be demonstrated that the performance or condition of structures, systems, and components is being effectively controlled through the performance of appropriate preventive maintenance, performance and condition monitoring against licensee-established goals is not required. Performance and condition-monitoring activities and associated goals and preventive maintenance activities must be evaluated once every refueling cycle, provided the interval between evaluations does not exceed 24 months.

As discussed in Regulatory Guide 1.160, the extent of monitoring may vary from system to system, depending on the system's importance to risk. Some monitoring at the component level may be necessary. However, most of the monitoring could be done at the plant, system, or system train level. For systems, structures, and components that fall within the requirements of §50.65(a)(1), licensees must establish goals and monitor performance against these goals. These goals will be derived from information in the CLB and supplemented by improved understanding of the equipment risk significance. These goals may be performance oriented (reliability, unavailability) or condition oriented (pump flow, pressure, vibration, valve stroke time, current, electrical resistance). An effective preventive maintenance program

is required under §50.65(a)(2) if monitoring under §50.65(a)(1) is not performed.

The SOC for the maintenance rule (56 FR 31308; July 10, 1991) states that the scope of §50.65(a)(2) includes those systems, structures, and components that have "inherently high reliability" without maintenance. It is expected that many long-lived, passive structures and components could be considered inherently reliable by licensees and not be monitored under 10 CFR 50.65(a)(1). There may be few, if any, actual maintenance activities (e.g., inspection or condition monitoring) that a licensee conducts for such systems, structures, and components. Further, experience gained under the current license renewal rule, staff review of industry reports, NRC aging research, and operating experience indicate that such structures and components should be reviewed for license renewal if they are passive, long-lived and not nonredundant. Therefore, the Commission believes that such structures and components that are technically within the scope of the maintenance rule should not be excluded from review for license renewal on the basis of their inherent reliability.

Although the maintenance rule does not become effective and enforceable until July 10, 1996, the Commission believes that reliance on the rule is an acceptable basis for managing the effects of aging for active portions of systems, structures, and components. As discussed in Regulatory Guide 1.160, implementation of the maintenance rule relies extensively on existing maintenance programs and activities. The industry has developed guidance for complying with the maintenance rule. The NRC staff has reviewed this guidance and found it acceptable. Many utilities may follow the industry guidance in implementing the maintenance rule. Furthermore, the failure of any licensee

to comply with the maintenance rule is enforceable by the Commission after July 10, 1996.

Therefore, the Commission believes that with the additional experience it has gained with age-related degradation reviews and with the implementation of the maintenance rule, there is a sufficient basis for concluding that with the exception of activities for "long-lived," "passive" systems, structures, and components, current licensee programs and activities, along with the regulatory process, will be adequate to manage the effects of aging on (1) the active features of all equipment within the scope of license renewal and (2) the passive features of redundant equipment within the scope of license renewal during the period of extended operation such that the CLB will be maintained. The bases for this conclusion are discussed further in the following sections.

(iv) Integration of the regulatory process and the maintenance rule with the license renewal rule.

Because of the resultant insight and understanding that the NRC gained in developing the implementation guidance for the maintenance rule, the Commission is now in a position to more fully integrate the maintenance rule and the license renewal rule. Because the intent of the license renewal rule and the maintenance rule is similar (ensuring that the detrimental effects of aging on the functionality of important systems, structures, and components are effectively managed), the Commission has determined that the license renewal rule should credit existing maintenance activities and maintenance rule requirements for most plant equipment. Fundamental to establishing

credit for the existing programs and the requirements of the maintenance rule is the recognition that licensee activities associated with the implementation of the maintenance rule will continue throughout the renewal period and are consistent with the first principle of license renewal. As a result, the requirements in this proposed rule reflect a greater reliance on existing licensee programs that manage the detrimental effects of aging on functionality, including those activities implemented to meet the requirements of the maintenance rule.

In addition to the maintenance rule, the Commission has many individual requirements relative to maintenance throughout its regulations. These include 10 CFR 50.34(a)(3)(i); 50.34(a)(7); 50.34(b)(6)(i), (ii), (iii), and (iv); 50.34(b)(9); 50.34(f)(1)(i), (ii), (iii); 50.34(g); 50.34a(c); 50.36(a); 50.36(c)(2), (3), (5), and (7); 50.36a(a)(1); 50.49(b); 50.55a(g); Part 50, Appendix A, Criteria 1, 13, 18, 21, 32, 36, 37, 40, 43, 45, 46, 52, 53; and Part 50, Appendix B.

(v) Excluding components with active functions and redundant components.

Performance and condition monitoring for systems, structures, and components typically involves the collection and analysis of key parametric data. This data provides information on the practical effects of age-related degradation on the functionality of plant equipment. The nature of this parametric data associated with active functions (e.g., pump flows, pressure, vibrations, valve stroke time, current, electrical resistance) makes the data generally easier to monitor and analyze than parametric data related to passive functions (e.g., pipe wall thinning, fracture toughness, ductility,

and mechanical strength). Although, as previously discussed, the requirements of the maintenance rule apply to equipment that performs both active and passive functions, the Commission has determined that performance and condition-monitoring programs for components that perform passive functions present limitations that should be considered in determining which equipment can be generically excluded from an aging management review for license renewal.

Based on consideration of the effectiveness of existing programs which monitor the performance and condition of equipment that performs active functions, the Commission concludes that active functions of plant equipment can be excluded from license renewal aging management review. Functional degradation resulting from the effects of aging of equipment that performs active functions is more readily determinable, and existing programs and requirements applicable to this equipment are expected to continue to ensure the functionality of such equipment. Considerable experience has demonstrated the effectiveness of these programs and the performance-based requirements of the maintenance rule delineated in §50.65 are expected to further enhance existing maintenance programs. For example, many licensee programs that ensure compliance with technical specifications are based on surveillance activities that monitor performance of active equipment. As a result of the continued applicability of existing programs and regulatory requirements, the Commission believes that active functions of plant equipment will be reasonably assured in any period of extended operation. Further discussion and justification for exclusion of active functions of components within the scope of the license renewal rule but outside the scope of the maintenance rule are presented in section (vi).

In attempting to simplify the license renewal rule by focusing on the renewal aging management review, the Commission has also considered the effectiveness of current programs and requirements that are intended to ensure the functionality of redundant components. Because equipment that performs active functions has been determined to be subject to adequate aging management programs, the principal focus here is on redundant equipment that performs passive functions.

Redundant equipment is one aspect of a defense-in-depth design philosophy that provides reasonable assurance that certain single failures will not render a system incapable of performing its safety or intended function(s). Therefore, redundancy of components provides a level of additional assurance that aging effects will be detected before any resultant failure renders the system or structure unable to perform its intended function. This additional assurance supplements existing programs and requirements for inspections and surveillance to assess the condition of equipment and ensure continued functionality.

Hypothetically, simultaneous failures of redundant components because of the detrimental effects of aging are possible. However, given the physical variables and the differences in operational and maintenance history that will influence the incidence and rates of aging degradation between otherwise identical components, the likelihood of simultaneous failures of redundant components due to the effects of age-related degradation are extremely small.

In addition, a failure of one redundant component, while not resulting in a loss of system function, will result in activities required by the maintenance rule (and other regulatory required systems, such as 10 CFR Part 50, Appendix B) to mitigate the possibility of future failures in all similar redundant components. The maintenance rule requires that both plant-specific and industry-wide experience with these failures be considered in implementing effective maintenance strategies. Together with existing programs and requirements, including the maintenance rule, for managing the effects of aging, the redundant design of these components provides a sufficient basis to conclude that the structures or systems will perform their intended functions in the period of extended operation.

As a result of the Commission's further consideration of the effectiveness of existing programs and requirements, it has determined that the exclusive focus of the license renewal aging management review for license renewal should be on long-lived, nonredundant structures and components which perform passive functions. Further discussion of the structures and components that require an aging management review to ensure functionality and maintenance of the CLB for renewal is presented later.

(vi) Excluding active fire protection components.

The scope of the maintenance rule does not, in general, include installed fire protection equipment because performance and condition monitoring of fire protection equipment is required by §50.48. Therefore, for the purposes of license renewal, installed active portions of structures and components can be excluded from aging management review because they are

either within the scope of §50.65 or §50.48. Compliance with §50.48 is verified through the NRC inspection program.

The fire protection rule (§50.48) requires each nuclear power plant licensee to have in place a fire protection plan (FPP) that satisfies 10 CFR Part 50, Appendix A, Criterion 3. Licensees are required by §50.48 to retain the FPP and each change to the plan until the Commission terminates the reactor license. The NRC reviews each licensee's total FPP as described in the licensee's safety analysis report (SAR), using basic review guidance described in §50.48, as applicable to each plant.

The FPP establishes the fire protection policy for the protection of structures, systems, and components important to safety at each plant and the procedures, equipment, and personnel requirements necessary to implement the program at the plant site. The FPP is the integrated effort that involves components, procedures, and personnel to carry out all activities of fire protection. The FPP includes system and facility design, fire prevention, fire detection, annunciation, confinement, suppression, administrative controls, fire brigade organization, inspection and maintenance, training, quality assurance, and testing.

The FPP is part of the CLB and contains maintenance and testing criteria that provide reasonable assurance that fire protection equipment is capable of performing its intended function. The Commission concludes that it is appropriate to allow license renewal applicants to take credit for the FPP as an existing program that manages the detrimental effects of aging. The Commission concludes that active functions of installed fire protection components are excluded from aging management review based on a generic finding that performance or condition-monitoring programs afforded by the FPP

are capable of detecting and subsequently mitigating the detrimental effects of aging.

(vii) Future exclusion of structures and components based on NRC requirements.

As part of the ongoing regulatory process, the NRC evaluates emerging technical issues and, when warranted, establishes new or revised regulatory requirements as part of the resolution of a new technical issue, subject to the provisions of the backfit rule (§50.109). Increasing experience with aging nuclear power plants has led to the imposition or consideration of additional requirements. For example, at this time the Commission is considering rulemaking activities associated with steam generator performance and containment inspections. For steam generators, the Commission is considering the need for a performance-based rule to address steam generator tube integrity. To address concerns regarding containments and liners, the Commission is considering amending §50.55(a) to incorporate the most recent version of Subsections IWE and IWL in the American Society of Mechanical Engineers (ASME) Code, Section XI.

Such new requirements, if implemented, would be relevant to both aging management and the scope of equipment receiving a detailed aging management review for license renewal (i.e., certain long-lived, passive systems, structures, and components). As a result, as part of relevant future rulemakings, the Commission intends to evaluate whether these new requirements can be considered effective in continuing to manage the effects of aging through any renewal term. A positive conclusion could establish the bases for

further limiting the scope of equipment that requires an aging management review for license renewal.

e. *Current licensing basis and maintaining the function of systems, structures, and components.*

In the SOC for the current license renewal rule, the Commission concluded that, with the exception of ARDUTLR, the current regulatory processes are sufficiently broad and rigorous and that these processes generally provide reasonable assurance that extended operation of existing plants would not endanger the public health and safety and would not be inimical to the common defense and security. By stating that the CLB must be maintained for the period of extended operation, the Commission indicated its intent to ensure the continuation of an acceptable level of safety for the plant. (Note: The expression in the second principle "Maintaining the CLB," recognizes that a plant's CLB is not fixed. Rather, the CLB is dynamic and can be modified at any time during the initial operating term, during the license renewal process, and during the period of extended operation.)

As discussed in the SOC for the current license renewal rule, the Commission stated that continued safe operation of a nuclear power plant requires that systems, structures, and components that perform or support safety functions continue to perform in accordance with the applicable requirements in the licensing basis. In addition, the Commission stated that the effects of ARDUTLR must be mitigated to ensure that the aged systems, structures, and components will adequately perform their designed safety or intended function.

In developing this proposed rule, a key issue that the Commission considered was whether or not a focus on ensuring a structure's or component's function through performance or condition monitoring is a sufficient basis for concluding that the CLB will be maintained throughout the period of extended operation. The Commission considered whether the regulatory process and a focus on functionality during the license renewal review for the period of extended operation are sufficient to provide reasonable assurance that an acceptable level of safety (i.e., the CLB) will be maintained.

Continued safe operation of a commercial nuclear power plant requires that systems, structures, and components that perform or support safety functions continue to function in accordance with the applicable requirements in the licensing basis of the plant and that other plant systems, structures, and components do not substantially increase the frequency of challenges to plant safety systems. As a plant ages, a variety of aging mechanisms are operative, including erosion, corrosion, wear, thermal and radiation embrittlement, microbiologically induced aging effects, creep, shrinkage, and possibly others yet to be identified or fully understood. However, the detrimental effects of aging mechanisms can be observed by detrimental changes in the performance characteristics or condition of systems, structures, and components if they are properly monitored.

Aging can affect all systems, structures, and components to some degree. Generally, the changes resulting from detrimental aging effects are gradual. Licensees have ample opportunity to detect these degradations through performance and condition-monitoring programs, technical specification surveillances required by §50.36, and other licensee maintenance activities. Except for some well-understood aging mechanisms such as neutron embrittlement

and intergranular stress corrosion cracking, the straightforward approach to detecting and mitigating the effects of aging begins with a process that verifies that the intended design functions of systems, structures, and components have not been compromised or degraded. Licensees are required by current regulations to develop and implement programs that ensure that conditions adverse to quality, including degraded system function, are promptly identified and corrected. The licensees' programs include self-inspection, maintenance, and technical specification surveillance programs that monitor and test the physical condition of plant equipment.

For example, technical specifications include limiting conditions for operation (LCOs), which are the lowest *functional capability* or *performance levels* of equipment required for safe operation of the facility. Technical specifications also require surveillance requirements relating to test, calibration, or inspection to ensure that the necessary quality of systems and components is maintained, that facility operation will be within the safety limits, and that the LCOs will be met. Furthermore, §50.55(a) requires, in part, that structures, systems, and components be tested and inspected against quality standards commensurate with the importance of the *safety function* to be performed, such as inservice testing (IST) and inservice inspections (ISIs) of pumps and valves.

Elements for timely mitigation of age-related degradation effects include activities that provide reasonable assurance that systems, structures, and components will perform their intended functions when called upon to do so. Through these programs, licensees identify the degradation of components resulting from a number of different environmental stressors as well as degradation from faulty maintenance or other errors caused by personnel. Once

a detrimental performance or condition caused by aging or other factors is revealed, mitigating actions are taken to fully restore the conditions within the design basis. As a result of these programs, degradation due to aging mechanisms (detrimental aging effects) is currently being adequately managed, either directly or indirectly, for many systems, structures, and components.

Consequently, there is considerable logic in ensuring that the design basis (as defined in §50.2) of systems, structures, and components is maintained through activities that ensure continued functionality. This process is relied on in the current term to ensure continued *operability* of systems, structures, and components and includes surveillance of plant equipment to ensure that, to the greatest extent practicable, it properly performs the intended design functions. The focus on maintaining operability results in the continuing capability of systems, structures, and components, including supporting systems, structures, and components, to perform their intended functions as designed.

A key element of the 10 CFR Part 54 definition of the CLB is the plant-specific design-basis information defined in 10 CFR 50.2. According to this definition, "[d]esign bases means that information which identifies the specific functions to be performed by a structure, system, or component of a facility, and the specific values or ranges of values chosen for controlling parameters as reference bounds for design." In addition, design bases identify specific functions to be performed by a system, structure, and component, and design-basis values may be derived for achieving functional goals. For plant structures and components that are not subject to performance or condition-monitoring programs or for plant structures and components on which the detrimental effects of aging may not be as readily

apparent, verification of specific design values (e.g., piping wall thickness) or demonstration by analysis can be a basis for concluding that the function of the system, structure, or component will be maintained in the period of extended operation.

When the design bases of systems, structures, and components can be confirmed either directly by inspection or by verification of functionality through test or analysis, a reasonable conclusion can be drawn that the CLB is or will be maintained. This conclusion recognizes that the portion of the CLB that can be impacted by the detrimental effects of aging is limited to the design bases aspects of the CLB.

Although the definition of CLB in Part 54 is broad and encompasses various aspects of the NRC regulatory process (e.g., operability and design requirements), the Commission concludes that a specific focus on functionality is appropriate for performing the license renewal review. Reasonable assurance that the function of important systems, structures, and components will be maintained throughout the renewal period, combined with the rule's stipulation that all aspects of a plant's CLB (e.g., technical specifications) and the NRC's regulatory process carry forward into the renewal period, are viewed as sufficient to conclude that the CLB (which represents an acceptable level of safety) will be maintained. Functional capability is the principal emphasis for much of the CLB and is the focus of the maintenance rule and other regulatory requirements to ensure that aging issues are appropriately managed in the current license term.

An example of performance verification activities that must be performed by licensees is the integrated loss of coolant accident (LOCA)/loss of offsite power (LOOP) integrated test. This technical specification surveillance is

typically required to be performed at least once every 18 months. This test simulates a coincident LOCA/LOOP (design-basis accident) for each train or division of emergency alternating current (ac) power source (e.g., emergency diesel generators), the associated emergency core cooling systems (ECCS) (e.g., safety injection subsystems), and other electrically driven safety components (e.g., containment isolation valves, emergency ventilation/filtration components, and auxiliary steam generator feed components). All engineered safety features required to actuate for an actual LOCA/LOOP are required to actuate for the test and either duplicate the LOCA/LOOP function completely (e.g., electric loads are sequenced onto emergency busses, containment isolation valves actually shut from full open positions) or approximate the actual function to the greatest extent practicable (e.g., safety injection pumps start and run in recirculation mode instead of actually injecting water into the reactor coolant system). Design-basis values that can only be measured during this testing, such as load sequence times and emergency bus voltage response to the sequenced loads, are verified. Between integrated tests, monthly and quarterly surveillances verify specific component performance criteria such as valve stroke times or pump flow values. The acceptance criteria stated in the surveillance requirements are derived from design-basis values with appropriate conservatisms built in to account for any uncertainties or measurement tolerances. Satisfactory accomplishment and periodic repetition of these types of surveillance provide reasonable assurance that system and component functions will be performed as designed.

f. Integrated plant assessment.

The current license renewal rule requires license renewal applicants to perform a systematic screening of plant systems, structures, and components to ultimately determine if aging would be adequately managed in the period of extended operation. This IPA process would begin broadly and consider all plant systems, structures, and components. The IPA would then focus on only those that are important to license renewal and finally on only those that could be subject to ARDUTLR. For those systems, structures and components subject to ARDUTLR, the IPA process required an evaluation and demonstration that either (1) new programs or licensee actions would be implemented to prevent or mitigate any ARDUTLR during the period of extended operation or (2) justifies that no actions are necessary.

Based on experience gained from implementation of the license renewal rule, the Commission determined that the current license renewal review would require the evaluation of an unnecessarily large number of plant systems, structures, and components to establish appropriate aging management in the period of extended operation. Experience, further consideration of existing activities, and the requirements of the maintenance rule have led the Commission to conclude that many of these systems, structures, and components are already subject to activities that ensure their function through any period of extended operation. Therefore, the Commission proposes to amend the IPA process in the license renewal rule to more efficiently focus the license renewal review on certain systems, structures, and components for which the regulatory process and existing licensee programs and activities may not

adequately manage the detrimental effects of aging in the period of extended operation.

The approach reflected in this proposed rule maintains the requirement for each renewal applicant to address possible detrimental effects of aging for certain systems, structures, and components during the period of extended operation through the IPA process. The proposed rule would simplify the IPA process consistent with (1) the Commission's determination that the aging management review should focus on ensuring that systems, structures, and components perform their intended function and (2) the additional experience the Commission has gained related to aging management review since publishing the current license renewal rule. The proposed rule would still require that applicants for license renewal take necessary actions to ensure that the CLB will be maintained and thus maintain an acceptable level of safety during the period of extended operation.

Similarly, the IPA process would continue to require an initial review of all plant systems, structures, and components to identify the scope and would then focus on those structures and components requiring aging management review for license renewal. The principal differences between the IPA process in the current license renewal rule and the IPA process in the proposed rule is --

(1) The determination of the reduced set of structures and components which must undergo aging management review;

(2) The form of the aging management review (managing the effects of aging on functionality versus managing aging mechanisms); and

(3) The elimination of the term ARDUTLR.

(i) Determination of structures and components requiring aging management review for license renewal.

In the SOC for the current license renewal rule, the Commission stated that as it gains more experience with age-related degradation reviews it may revisit the need for such a disciplined review process and may narrow the scope of the safety review. The Commission now believes that after reviewing its recent implementation experience, narrower scope of review is warranted. The Commission concludes that a generic exclusion from aging management review is appropriate for those categories of systems, structures, and components subject to existing programs and activities that the Commission believes are sufficient to provide reasonable assurance of continued function in the period of extended operation.

As discussed in Section III.d of this SOC, the Commission has determined that the current regulatory process, existing licensee programs and activities, and the maintenance rule provide an acceptable rationale for generically concluding that portions of structures and components that have active functions and structures and components whose failure will not result in loss of intended system or structure function can be excluded from an aging management review. However, the Commission does not believe that it can generically exclude structures and components that --

(1) Do not have performance and condition characteristics that are as readily monitorable as active components;

(2) Are likely to be in service beyond the original operating term; and

(3) Do not have the established defense-in-depth design found in redundant equipment.

Unlike the extensive experience associated with the performance and condition monitoring of equipment performing active functions, little experience has been gained from the evaluation of long-term effects of aging on portions of equipment that perform passive functions. The Commission considers that the detrimental effects of aging for these structures and components are less apparent than portions of structures and components having active functions. Therefore, the Commission concludes that a generic exclusion is inappropriate at this time. The Commission also concludes that an aging management review of these structures and components is warranted to provide the reasonable assurance that their intended functions are adequately maintained during the period of extended operation. Additional experience with managing the effects of aging on the function of this equipment may narrow the selection of structures and components requiring an aging management review for license renewal in the future.

(a) "Passive" systems, structures, and components.

In Section III.d of this SOC the Commission concluded that portions of components having active functions can be excluded from an aging management review based on performance or condition-monitoring programs. The Commission recognizes that "passive" components, in general, do not have performance and condition characteristics that are as readily monitorable as active components. Therefore, the Commission concludes that an aging management review for certain passive structures and components is required for license renewal.

The Commission has reviewed several industry concepts of "passive" structures and components and has determined that they do not accurately describe the structures and components that should be subject to an aging management review for license renewal. Accordingly, the Commission has developed a description of "passive" characteristics of structures and components that require aging management review. Furthermore, the Commission has directly incorporated these characteristics into the IPA process to avoid the creation of a new term, "passive." This SOC uses the term "passive" for convenience. Furthermore, the description of "passive" structures and components incorporated into §54.21(a) should be utilized only in connection with the IPA review in the license renewal process.

The maintenance rule implementation guidance contains a provision by which licensees may classify certain systems, structures, and components (e.g., raceways, tanks, and structures) as inherently reliable. Inherently reliable systems, structures, and components by definition generally do not require any continuing maintenance actions and should be considered as "passive."

The Commission considers structures and components for which aging degradation is not readily monitored to be those that perform an intended function without moving parts or without a change in configuration or properties. For example, a pump or valve has moving parts, an electrical relay can change its configuration, and a battery changes its electrolyte properties when discharging. Therefore, the performance or condition of these components is readily monitored and would not be captured by this description. Further, the Commission proposes that "a change in configuration or properties" should be interpreted to include "a change in state," which is a

term sometimes found in the literature relating to "passive." For example, a battery can "change its state" and therefore would not be screened in under this description.

Structures or components may have multiple functions, thus some structures or components may meet the "passive" description. For example, although a pump or a valve has some moving parts, a pump casing or valve body performs a pressure-retaining function without moving parts. A pump casing or a valve body meets this description and would therefore would be considered for an aging management review. However, the moving parts of the pump, such as the pump impeller, would not be subject to aging management review.

As examples of the implementation of this screening requirement, the Commission would consider structures and components meeting the passive description as including, but not limited to, the reactor vessel, the reactor coolant pressure boundary, steam generators, the pressurizer, piping, pump casings, valve bodies, the core shroud, piping supports, the spent fuel rack, pressure retaining boundaries, heat exchangers, ventilation ducts, the containment, the containment liner, electrical penetrations, mechanical penetrations, equipment hatches, seismic Category I structures, electrical cables and connections, cable trays, and electrical cabinets.

Additionally, the Commission would consider structures and components not meeting the "passive" description as including, but not limited to, the portions of pumps that do not form pressure retaining boundaries, motors, diesel generators, air compressors, snubbers, the control rod drive, ventilation dampers, pressure transmitters, pressure indicator, water level indicators, switchgears, cooling fans, transistors, batteries, breakers,

relays, switches, power inverters, circuit boards, battery chargers, and power supplies.

(b) "Long-lived" structures and components.

The Commission recognizes that the detrimental effects of aging will increase as service life is extended. One way to effectively mitigate these effects is through component replacement. Accordingly, maintenance programs that periodically replace components may provide reasonable assurance that the effects of aging will not impair component performance during the period of extended operation. Conversely, components that are not replaced may be more likely to be impaired by cumulative aging effects.

The Commission considers components to be "long-lived" if they are not subject to periodic replacement based on a qualified life or a specified time period. Therefore, in addition to the "passive" screening criterion, the Commission concludes that components that are not replaced based on a qualified life or specified time period must be considered for an aging management review.

It is important to note, however, that the Commission has decided not to generically exclude components that are replaced based on performance or condition from an aging management review. The Commission does not intend to preclude a license renewal applicant from providing site-specific justification in a license renewal application that a replacement program based on performance or condition for a passive component provides reasonable assurance that functionality will be maintained in the period of extended operation.

(c) Failure would result in loss of a system or structure-intended function.

In Section III.d of this SOC, the Commission concluded that redundancy is one aspect of a defense-in-depth design philosophy. Therefore, it provides a level of assurance that the effects of aging will be mitigated before any resultant failure renders the system or structure unable to perform its intended function. Conversely, the Commission reasons that lack of redundancy in systems or structures, especially for those systems, structures, or components for which performance or condition is not readily monitored (i.e., that meet the "passive" description), make it more likely that aging will result in an equipment or component failure that renders a system or a structure incapable of performing its intended function. Nonredundant refers to the situation in which a failure of a structure or component would result in the loss of a system or structure function.

Accordingly, certain passive nonredundant structures and components cannot be excluded from further review because the consequences of a failure are unacceptable or undesirable (e.g., reactor vessel, containment, control rod drive system piping). For these passive structures and components that are highly reliable and may require little, if any, preventive maintenance, it may be that licensees have only indirect indications of degraded performance (e.g., water chemistry analysis, corrosion/erosion programs, loose parts monitoring systems, etc.). For these reasons, the Commission believes that, in general, passive nonredundant structures and components that are necessary for a system to perform its intended function(s) should be subject to aging management review.

The Commission concludes that aspects of systems can be considered nonredundant if a single failure of a subsystem active component (assuming no passive failure) or a single failure of a subsystem passive component (assuming no active failure) will result in a loss of the capability of the system to perform its intended functions. Nonredundancy is considered to be a functional nonredundancy and not necessarily a physical nonredundancy. To eliminate portions of systems from an aging management review, a license renewal applicant must determine the system boundaries for which a component failure will result in the failure of the system to perform its intended function(s) (e.g., an unisolable system pressure boundary failure).

Examples of the implementation of the "nonredundant" criterion include the boiling-water reactor (BWR) high-pressure coolant injection (HPCI) system, the residual heat removal (RHR) system, and the recirculation system. Because the HPCI system is safety related and functions to ensure the capability to prevent or mitigate the consequences of accidents (i.e., LOCAs), it meets the criterion for being within the scope of license renewal. Further, the BWR HPCI system piping and pump are, in general, long-lived components and nonredundant (i.e., HPCI is a single-train system). The Commission would consider passive portions of the HPCI system, including the pump casing and associated piping, to require an aging management review.

Conversely, the RHR system pump casings, as well as redundant portions of the system piping, may not require an aging management review. The RHR system is within the scope of license renewal because it is safety related and functions to prevent or mitigate the consequences of accidents. Further, the RHR pump casing and system piping is long-lived as well as "passive." However, the RHR system has redundant trains. If an applicant determines that

a single passive failure of redundant train components would not result in the loss of a system function, these components would not require an aging management review.

Finally, consider a two-loop BWR recirculation system, the two loops are nearly identical, with the exception of some intersystem connections. However, these two loops cannot be considered redundant because they form part of the reactor coolant pressure boundary and a single passive failure could result in a loss of the capability of the recirculation system piping to perform its function as a pressure boundary.

The Commission believes that it is important to make the distinction between redundancy and diversity. A system, structure, or component may not be categorically excluded from aging management review on the basis that there is a system that performs a similar function in a diverse manner. For example, the automatic depressurization system (ADS), in conjunction with a low-pressure injection system, and the HPCI system of a BWR have traditionally been considered diverse methods for coping with a small-break LOCA. The ADS is not redundant to the HPCI system. To argue that an aging management review of the ADS is not required because the HPCI system performs a similar safety function in a diverse manner and that an aging management review of the HPCI is not required because the ADS performs a similar safety function in a diverse manner would be circular and, therefore, unacceptable.

(ii) The IPA process.

The Commission proposes to revise and simplify the IPA requirements (§54.21(a)) as follows:

First, instead of listing those systems and structures that are important to license renewal, the Commission proposes to require only a list (from those systems and structures within the scope of license renewal) of structures and components that a licensee determines to be subject to an aging management review for the period of extended operation. A licensee has the flexibility to determine the set of structures and components for which an aging management review is performed, provided that this set encompasses the structures and components for which the Commission has determined an aging management review is required for the period of extended operation. Therefore, a licensee's aging management review must include structures and components --

(1) That were not subject to replacement based on a qualified life or a specified time period;

(2) That perform an intended function (§54.4) without moving parts or without a change in configuration or properties; and

(3) Whose failure would directly result in loss of intended system or structure function (§54.4(b)) during the period of extended operation.

In establishing this flexibility, the Commission recognizes that licensees may find it preferable to not take maximum advantage of the Commission's generic conclusion regarding structures and components which do not require agency management review, and may undertake a broader scope of

review than is minimally required. For example, a licensee may desire to review all "passive" and "long-lived" structures and components. This set of structures and components would be acceptable because it includes "nonredundant" as well as "redundant" structures and components and, therefore, encompasses all of the equipment which would be identified through criteria (1), (2), and (3).

Second, the IPA must contain a description of the methodology used to determine those systems and structures within the scope of license renewal and those structures and components subject to an aging management review, such that the minimum required structures and components are included.

Third, the IPA must contain a demonstration for each structure and component subject to an aging management review so that the effects of aging will be managed in such a way that the intended function(s) will be maintained for the period of extended operation. This demonstration should include a description of activities, as well as any changes to the CLB and plant modifications that are relied upon to demonstrate that the intended function is adequately maintained despite the effects of aging in the period of extended operation.

g. Time-limited aging analyses and exemptions.

(i) Time-limited aging analyses.

The definition of ARDUTLR in the current license renewal rule requires a licensee evaluation and NRC approval of previous time-limited aging analyses for systems, structures, and components within the scope of license renewal

that either were based on an assumed service life or a period of operation defined by the original license term. For example, certain plant-specific safety analyses may have been based on an explicitly assumed 40-year plant life (e.g., aspects of the reactor vessel design). As a result, an evaluation for license renewal would be required. Time-limited aging analyses based on an assumed period of plant operation short of the current operating term should be addressed within the original license and are of no concern for license renewal.

Because the Commission proposes to delete the definition of ARDUTLR, the amended license renewal rule would have to identify these explicit time-limited analyses as issues that must be clearly addressed within the license renewal process. The proposed rule would explicitly require that --

(1) Applicants address such time-limited aging issues relevant to systems, structures, and components within the scope of license renewal in the license renewal application; and

(2) The Commission include the adequate resolution of time-limited aging analysis issues as part of the standards for the proposed rule amendment for issuance of a renewed license.

The time-limited provisions or analyses of concern are those that --

(1) Involve the effects of aging;

(2) Involve time-limited assumptions defined by the current operating term, for example, 40 years;

(3) Involve systems, structures, and components within the scope of license renewal;

(4) Involve conclusions or provide the basis for conclusions related to the capability of the system, structure, and component to perform its intended functions;

(5) Were determined to be relevant by the licensee in making a safety determination; and

(6) Are contained or incorporated by reference in the CLB.

The applicant for license renewal will be required in the renewal application to --

(1) Justify that these analyses are valid for the period of extended operation;

(2) Extend the period of evaluation of the analyses such that they are valid for the period of extended operation, for example, 60 years; and

(3) Justify that the effects of aging will be adequately managed for the period of extended operation if an applicant cannot or chooses not to justify or extend an existing time-limited aging analysis.

The Commission considers analyses to be "relevant" if the analyses provided the basis for the licensee's safety determination and, in the absence of the analyses, the licensee would have reached a different safety conclusion. Time-limited aging analyses that need to be addressed are not necessarily those analyses that have been previously reviewed or approved by the Commission. The following examples illustrate time-limited aging analyses that may need to be addressed and were not previously reviewed and approved by the Commission.

(1) The FSAR states that the design complies with a certain ASME code. A review of the ASME code reveals that a time-limited aging analysis is required. The actual calculation was performed by the licensee to meet code

requirements, the specific calculation was not referenced in the FSAR, and the NRC had not reviewed the calculation.

(2) In response to a generic letter, a licensee submitted a letter to the NRC committing to perform a time-limited aging analysis that would address the concern in the generic letter. The NRC had not documented a review of the licensee's response and had not reviewed the actual analysis.

The Commission expects that the number of time-limited aging analyses that would have to be addressed is relatively small. Although the number and type will vary depending on the plant-specific CLB, these analyses could include reactor vessel neutron embrittlement (pressurized thermal shock, upper-shelf energy, surveillance program), concrete containment tendon prestress, metal fatigue, EQ of electrical equipment, metal corrosion allowance, inservice flaw growth analyses that demonstrate structural stability for 40 years, inservice local metal containment corrosion analyses, high-energy line-break postulation based on fatigue CUF, and an inservice inspection program for piping based on fatigue CUF.

(ii) Exemptions.

The current license renewal rule requires that an applicant for license renewal provide a list of all plant-specific exemptions granted under 10 CFR 50.12. For exemptions that were either granted on the basis of an assumed service life or a period of operation bounded by the original license term of the facility or otherwise related to systems, structures, or components subject to ARDUTLR, an evaluation that justifies the continuation of the exemptions for the renewal term must be provided.

With the deletion of the definition of ARDUTLR and the corresponding addition of a separate time-limited aging analysis section, the Commission proposes to include this exemption review with the separate time-limited aging analyses section (§54.21(c)). These changes are consistent with the Commission's intent to review exemptions based on time-limited aging analyses under the current rule.

h. Standards for issuance of a renewed license and the scope of hearings.

Section 54.29 of the current license renewal rule provides that the Commission may issue a renewed license if --

(1) Actions have been identified and have been or will be taken with respect to age-related degradation unique to license renewal so that there is reasonable assurance that operation in the period of extended operation would be conducted in accordance with the plant's CLB. This necessarily includes compliance with the Atomic Energy Act of 1954 and the Commission's regulation as defined in §54.3);

(2) The applicable requirements of the Commission's environmental requirements in 10 CFR Part 51 have been satisfied; and

(3) Any matters raised under 10 CFR 2.758 have been addressed as required by that section.

Issues that are material to the findings in §54.29 of the current rule, as well as matters approved by the Commission for hearing under §2.758, were within the scope of a hearing on a renewed license. The December 13, 1991, license renewal rule also modified §2.758 to clarify that challenges to the

license renewal rule in an adjudicatory hearing on a renewal application would be considered by the Commission only in the following limited circumstances:

(1) That there are special circumstances with respect to age-related degradation unique to license renewal or environmental protection so that application of either 10 CFR Part 54 or 10 CFR Part 51 would not serve the purpose for which these rules were intended; or

(2) Because of circumstances unique to the period of extended operation, there would be noncompliance with the plant's CLB or operation that is inimical to the public health and safety during the period of extended operation.

The intent of these provisions was to clarify that safety and environmental matters not unique to the period of extended operation should not be the subject of the renewal application or the subject of a hearing in a renewal proceeding absent specific Commission direction. Rather, issues that represent a current problem for operation should be addressed in accordance with the Commission's regulatory process and procedures. Thus, a member of the public who believes that a current problem exists with a license or a matter exists that is not adequately addressed by current NRC regulations should either petition the NRC to take appropriate action under §2.206 or petition the NRC to institute rulemaking to address the issue under §2.802.

The Commission continues to believe that issues concerning operation during the currently authorized term of operation should be addressed as part of the current license rather than deferred until a renewal review (which would not occur if the licensee chooses not to renew its operating license). The Commission also proposes narrowing the scope of systems, structures, and components which will require an aging management review for the period of

extended operation and identification of time-limited aging analyses by the applicant as requiring aging management review. Accordingly, conforming changes in §54.29 are being proposed to reflect the refocused renewal review. Specifically, §54.29 would be revised to delete the term "age-related degradation unique to license renewal," and substitute the findings (required for consistency with the revised §54.21(a)(3) and (c)) with respect to aging management review and time-limited aging analyses for the period of extended operation. Furthermore, §54.29 would be modified to make clear that aging issues discovered during the renewal review for the structures and components that are reviewed in §54.21(a)(3) and that raise questions about the capability of these structures and components to perform their intended function during the current term of operation must be addressed under the current license, rather than as part of the renewal review. Finally, §2.758 has similarly been revised to delete the terms "age-related degradation unique to license renewal" and "unique to the requested term."

i. Regulatory and administrative controls.

Certain regulatory and administrative controls in the current license renewal rule were imposed to specify the circumstances and requirements necessary to make changes relating to the determination and management of ARDUTLR and the recordkeeping and reporting requirements relating to the renewal application. In view of the greater reliance on existing programs in the license renewal process, as discussed in Section III.d of this SOC, the Commission has determined that many of these requirements are no longer necessary. Therefore, the Commission proposes to decrease the recordkeeping

and reporting burden on the applicant for license renewal in the level of detail in the application, requirements for supplementing the FSAR, and in recordkeeping requirements.

The Commission seeks to ensure that, in general, only the information needed to make its safety determination is submitted to the NRC for license renewal review and that regulatory controls imposed by the license renewal rule are consistent with current regulatory controls on similar information that may be developed by a licensee during the current operating term.

(i) Controls on technical information in an application.

In §54.21, the current license renewal rule requires that an application include a supplement to the FSAR that presents the information required by this section. This information includes the IPA lists of systems, structures, and components; justification for assessment methods; and descriptions of programs to manage ARDUTLR.

The simplification of the IPA process (Section III.f of this SOC) and the clarification of the concept of ARDUTLR (Section III.b of this SOC) have resulted in a potential inconsistency regarding the treatment of information associated with the IPA. The Commission has determined that there is no need to include the entire IPA in an FSAR supplement because only the information associated with the IPA regarding the basis for determining that aging effects are managed in the period of extended operation requires the additional regulatory oversight afforded by placing the information in the FSAR. Therefore, only a summary description of the programs and activities for managing the effects of aging during the period of extended operation for

those structures and components requiring an aging management review need to be included in the FSAR supplement. The IPA methodology and the list of structures and components need not appear in an FSAR supplement. However, this information will still be required in the application for license renewal.

The Commission also proposes to eliminate §54.21(b) and §54.21(d). These sections concern CLB changes associated with ARDUTLR and plant modifications necessary to ensure that ARDUTLR is adequately managed during the period of extended operation. The Commission fully expects that relevant information concerning CLB changes and plant modifications required to demonstrate that aging effects for systems, structures, and components requiring an aging management review for license renewal will be described in the application for license renewal (proposed §§54.21(a)(3) and (c)). If a license renewal applicant or the Commission determines that CLB changes or plant modifications form the basis for an IPA conclusion regarding structures and components requiring an aging management review, then an appropriate description of the CLB change or plant modification must be included in the FSAR supplement and later changes can be controlled by §50.59.

Section 54.21(c) of the current license renewal rule requires that an applicant for license renewal submit (1) a list of all plant-specific exemptions granted pursuant to 10 CFR 50.12 and each relief granted pursuant to 10 CFR 50.55a and (2) an evaluation if the exemption or relief is related to a system, structure, or component that was subject to ARDUTLR or a time-limited function. These lists and evaluations would be included in the supplement to the FSAR. At that time, the Commission determined that these requirements were necessary to make an independent assessment that all

exemptions and reliefs had been evaluated as part of the license renewal process. The Commission determined that these requirements were important because they provided a summary of the instances in the licensing basis for the period of extended operation in which the staff determined that strict compliance with existing regulatory requirements is not needed to ensure that the public health and safety is adequately protected.

The Commission continues to believe that the rationale and basis for requiring the information to be submitted are still valid for exemptions. The Commission proposes to relocate the requirement to list and evaluate certain exemptions to proposed §54.21(c) so that exemptions can be considered a subset of time-limited aging issues and the conclusions about exemptions can be explicitly considered in the finding for license renewal.

However, consistent with the Commission's rationale for including only a summary description of programs and activities in the FSAR supplement, the Commission concludes that only a summary of time-limited aging analyses, including a summary of the bases for exemptions that concern aging effects, need to be included in the FSAR supplement. The Commission concludes that no need exists to establish additional requirements that place the list of exemptions or specific exemption evaluations into the FSAR supplement. This information must still be contained in the application for license renewal.

A relief from codes need not be evaluated as part of the license renewal process. A relief granted pursuant to 10 CFR 50.55a is specifically envisioned by the regulatory process. A relief expires after a specified time interval (not to exceed 10 years) and a licensee is required to rejustify the basis for the relief. At that time, the NRC performs another review and may or may not grant the relief. Because a relief is, in fact, an NRC-approved

deviation from the codes and subject to a periodic review, the Commission concludes that reliefs are adequately managed by the current regulatory process and should not require an aging management review and potential rejustification for license renewal. Therefore, the Commission proposes to delete the requirement to list and evaluate reliefs from §54.21(c).

(ii) Conditions of renewed license.

Section 54.33 requires that, upon renewal, a licensee maintain the programs and procedures which are reviewed and approved by the NRC staff who manage ARDUTLR. In addition, §54.33 establishes requirements for making changes to previously approved programs and procedures to manage ARDUTLR.

Considering the proposed amendments associated with the clarification of the concept of ARDUTLR, the Commission will review programs and procedures to manage the effects of aging for certain systems, structures, and components. However, the Commission will not approve specific programs and procedures as envisioned by the current license renewal rule (e.g., effective programs). The Commission will review programs and procedures described in the license renewal application and determine whether these programs and procedures provide reasonable assurance that the functionality of structures and components requiring an aging management review will be maintained in the period of extended operation. The license renewal review that would be conducted under this proposed rule may consider all programs and activities to manage the effects of aging that ensure functionality for these structures and components requiring an aging management review. A summary description of the programs and activities for managing the effects of aging for the period of

extended operation for these structures and components will be placed into the FSAR supplement. License conditions and limitations determined to be necessary as part of the license renewal review will continue to be required by the Commission in accordance with §54.33(b).

The regulatory process will continue to ensure that proposed changes to programs and activities that may affect descriptions in the FSAR will receive adequate review by the licensee and, if appropriate, by the NRC. Therefore, the Commission proposes to delete the §54.33(d) requirements for making changes to previously approved programs and procedures to manage ARDUTLR.

(iii) Additional records and recordkeeping requirements.

Section 54.37 currently requires that the periodic update required by §50.71(e) do the following:

(1) Include any systems, structures, and components newly identified as important to license renewal after the renewed license is issued;

(2) Identify and provide justification for any systems, structures, and components deleted from the list of systems, structures, and components important to license renewal; and

(3) Describe how ARDUTLR will be managed for those newly identified systems, structures, and components.

The Commission has determined that regulatory controls over programs or activities credited during the IPA process should not have additional regulatory oversight unless a program or activity is determined to be necessary to address the effects of aging for the period of extended operation. Therefore, the Commission proposes to modify §54.37(b) to limit

the information required in the FSAR supplement to a summary description of programs and activities regarding structures and components requiring an aging management for license renewal. For newly identified structures and components that would have required review for license renewal, the proposed requirement for the periodic FSAR update will require that the licensee's periodic FSAR update required by 10 CFR 50.71(e) describe how the effects of aging will be managed to ensure that the structures and components perform their intended function during the period of extended operation.

Section 54.37(c) currently requires that a licensee do the following:

(1) Submit to the NRC at least annually a list of all changes made to programs for management of ARDUTLR that do not decrease the effectiveness of "effective" programs, with a summary of the justification and

(2) Maintain documentation for any changes to "effective" programs that are determined not to reduce the effectiveness of the program.

Under the proposed rule, the Commission would review aspects of programs and procedures described in the license renewal application and determine whether these programs and procedures will provide reasonable assurance that the functionality of structures and components requiring an aging management review will be maintained in the period of extended operation. The license renewal review that would be conducted under this proposed rule may consider all programs and activities that manage the effects of aging and ensure functionality for these certain systems, structures, and components. The current regulatory process, existing licensee oversight activities, and the additional regulatory controls associated with placing a description of activities to manage the effects of aging into the FSAR are sufficient to ensure that changes to programs that could decrease the overall effectiveness

of the programs to manage the effects of aging for the systems, structures, and components requiring license renewal review will receive appropriate review by the licensee. Therefore, the Commission proposes to delete §54.37(c).

IV. Availability of Documents.

Copies of all documents cited in the Supplementary Information section are available for inspection and/or for reproduction for a fee in the NRC Public Document Room, 2120 L Street NW, (Lower Level), Washington, DC 20037.

In addition, copies of NUREGs cited in this document may be purchased from the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20013-7082. Copies are also available for purchase from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161. The NUREGs can also be accessed through the NRC electronic bulletin board system. Details of how to use this system were published in the Federal Register on November 25, 1992 (57 FR 55602).

V. Questions.

Although the Commission invites public comments on all issues in this proposed rule and statement of considerations, responses to the following questions are particularly solicited:

Discussion. An aging management review is required for a small subset of systems, structures, and components within the scope of license renewal. As described in Section III.f, the Commission believes, based upon current

regulatory requirements and operating experience, that the aging management review can be limited to "passive," "long-lived," "nonredundant" structures and components.

1. Should additional structures and components within the scope of license renewal be explicitly required to receive an aging management review?

2. If so, what would be the bases for requiring such additional structures and components to be subject to an aging management review?

Discussion. The Commission concluded in the SOC for the current license renewal rule (56 FR 64963; December 13, 1991) that 20 years of operational and regulatory experience provides a licensee with substantial amounts of information and would disclose any plant-specific concerns with regard to age-related degradation. In addition, a license renewal decision with approximately 20 years remaining on the operating license would be reasonable considering the estimated time necessary for utilities to plan for replacement of retired nuclear power plants. One utility has recently indicated that decisions regarding license renewal made earlier in the current license term may create substantial current-day economic advantages while still providing sufficient plant-specific history. This utility suggested that the earliest date for filing a license renewal application be changed so that a license renewal application can be submitted earlier than 20 years before expiration of the existing operating license. The term of the renewed license would still be limited to 40 years.

3. Is there a sufficient plant-specific history before 20 years of operation as specified in the current rule that provides reasonable assurance that aging concerns would be identified? If not, can reliance on industry-wide experience be used as a basis for considering an application for license renewal before 20 years of operation? What should be the earliest time an applicant can apply for a renewed license?

4. What additional safety, environmental, or economic benefits or concerns, if any, would result from a decision about license renewal made before the 20th year of current plant operation?

VI. Finding of No Significant Environmental Impact: Availability

A draft environmental assessment (EA) for this proposed rule has been prepared pursuant to the National Environmental Policy Act (NEPA), the regulations issued by the Council on Environmental Quality (40 CFR 1500-1508), and the NRC's regulations (10 CFR Part 51). Under NEPA and the NRC's regulations, the Commission must consider, as an integral part of its decisionmaking process on the proposed action, the expected environmental impacts of promulgating the proposed rule and the reasonable alternatives to the action. The NRC concludes that promulgation of the proposed rule would not significantly affect the environment and therefore a full environmental impact statement is not required and a finding of no significant impact (FONSI), can be made. The basis for these conclusions and the finding are summarized below. The EA and FONSI are issued as drafts, and public comments

are being solicited. The draft EA and FONSI are available in the NRC Public Document Room, 2120 L Street NW (Lower Level), Washington, DC.

The NRC staff previously assessed the environmental impacts from promulgation of the current license renewal rule in NUREG-1398, "Environmental Assessment for the Final Rule on Nuclear Power Plant License Renewal." In this assessment, the NRC staff concluded that the promulgation of 10 CFR Part 54 will have no significant impact on the environment. With this assessment as a baseline, the NRC staff's approach for assessing the environmental impact of the proposed amendment centered on analyzing any differences in the expected rule-related actions of the current rule compared to those under the proposed amendment.

The requirements for a renewed license under both the current rule and the proposed amendment are similar. Both approaches could result in the operation of plants up to 20 years beyond the expiration of the initial license. An emphasis would be placed on certain systems, structures, and components undergoing a specific aging management review to provide assurance that the effects of aging are adequately managed, ensuring functionality during the period of extended operation. Under both approaches, license renewal applicants must screen plant systems, structures, and components through an IPA to determine which systems, structures, and components will be subject to a license renewal review and then determine whether additional programs are required to manage the effects of aging so that equipment function is maintained. The principal differences between the proposed action and the current rule is in (1) the screening of systems, structures, and components to identify those that must undergo a specific aging management review and (2) the form of this aging management review.

Under the screening of systems, structures, and components that must be further reviewed, the proposed amendment effectively narrows the scope of systems, structures, and components subject to an aging management review. In general, the current rule contains a definition of ARDUTLR that would cause many systems, structures, and components to require further aging management review but would allow existing licensee programs and activities (including the maintenance rule) to serve as a basis for concluding that ARDUTLR will be adequately managed in the period of extended operation. The proposed amendment would retain the screening of systems, structures, and components but would reduce the scope of systems, structures, and components requiring review to a narrowly defined group based on an NRC determination in this rulemaking of the effectiveness of current licensee programs and NRC requirements that will continue into the period of extended operation. Because the proposed amendment has essentially the same results with respect to management of aging effects in the period of extended operation as the current rule, but provides a more efficient process to achieve these results, the environmental impacts of the proposed amendment would be similar to those under the current rule.

With respect to the form of the aging management review, the proposed rule would establish a clear focus on managing the functionality of structures and components in the face of detrimental aging effects as opposed to identification and mitigation of aging mechanisms. The Commission has concluded that the focus on identification of aging mechanisms is not necessary because regardless of the aging mechanism, only those that lead to degraded component performance or condition (i.e., potential loss of functionality) are of concern. Therefore, the Commission has concluded that

an aging management review that seeks to ensure a component's functionality is a more efficient and appropriate review. This change only improves the efficiency of the licensee's aging management review. Therefore, the environmental impacts would be similar to those under the current rule.

The ultimate licensee actions to manage aging in the renewal term under the proposed rule are expected to be similar to those under the current rule. However, the required aging management activities will be arrived at more efficiently under the proposed rule. Therefore, the environmental impact of relicensing under the proposed rule would be similar to that for relicensing under the current rule. It should be noted, however, that under the proposed rule an applicant need not include a projection of future aging effects and any corresponding mitigation activities (major refurbishment or other plant changes) for the renewal period. Instead, the focus is on assuring that programs are in place to identify and mitigate aging effects as they occur. As a result, this environmental assessment was limited to licensee activities required to put in place any relevant aging management programs rather than a review of any future mitigation activities that may be required under these programs.

VII. Paperwork Reduction Act Statement.

This proposed rule amends information collection requirements subject to the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.). This rule has been submitted to the Office of Management and Budget for review and approval of the information collection requirements.

The public reporting burden for this collection of information is estimated to average 94,000 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Information and Records Management Branch (T6 F33), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-3019, (3150-0155), Office of Management and Budget, Washington, DC 20503.

VIII Regulatory Analysis.

The NRC has prepared a regulatory analysis of the values and impacts of the proposed rule and of a set of significant alternatives. The regulatory analysis has been placed in the Commission's public document room for review by interested members of the public. A summary of the findings and conclusion of the regulatory analysis are discussed below.

The specific objective of the proposed rule is to clarify the Commission's requirements for license renewal by providing greater reliance on the maintenance rule and other existing licensee activities and programs for purposes of license renewal.

The NRC staff has defined and evaluated a set of specific alternatives that cover a range of activities that would meet the objective. The alternatives were evaluated and compared in the regulatory analysis. The results of the regulatory analysis are summarized as follows:

Alternative 1: Implement existing rule using SECY-93-049 and SECY-93-113 as guidance.

Alternative 1 (the existing rule) requires an integrated plant assessment (IPA), which consists of screening plant systems, structures, and components that are important to license renewal (ITLR), identifying those structures and components that could be subject to age-related degradation unique to license renewal (ARDUTLR), and demonstrating that ARDUTLR would be managed during the period of extended operation. Systems, structures, and components with an aging assessment based on time-limited analyses corresponding to the current operating term (40 years) would be treated as having ARDUTLR. The IPA would be included in a FSAR supplement.

The existing rule requires the greatest expenditures for license renewal because it is not explicit regarding reliance on the maintenance rule and other existing licensee activities and programs for purposes of license renewal. The regulatory analysis of the existing rule was published in NUREG-1362 (December 1991).

Alternative 2: Amend the existing rule to focus on long-lived, passive, nonredundant systems, structures, and components and systems, structures, and components with time-limited analyses according to SECY-93-331 and the Commission's staff requirements memorandum (SRM) dated February 2, 1994.

Alternative 2 would contain an IPA framework similar to the existing rule but would be simplified, including the elimination of the terms ARDUTLR and ITLR. Most systems, structures, and components subject to the maintenance rule or other existing programs would require no further evaluation for

license renewal. The focus of Alterative 2 is on long-lived, passive, nonredundant systems, structures, and components and those systems, structures, and components with aging assessment based on time-limited analyses. Although the IPA would be a part of the application, Alternative 2 would only require that the results and conclusions of the IPA be included in an FSAR supplement.

This alternative would require fewer expenditures for license renewal and achieve a similar reduction in risk to the public health, as does the existing rule. The Commission has identified the focus of license renewal, that is, long-lived, passive, nonredundant systems, structures, and components and systems, structures, and components with time-limited analyses. The Commission has decided that other systems, structures, and components would continue to be managed by the current regulatory process, including the maintenance rule and existing programs and require no further evaluation for license renewal.

Alternative 3: Amend the existing rule to focus on systems, structures, and components with time-limited analyses according to the NRC staff's "Option 4" discussed at the license renewal workshop (58 FR 42987; August 12, 1992).

Alternative 3 would rely on the current regulatory process, including the maintenance rule and other existing programs, tc address aging. Alternative 3 would only require a reevaluation of aging assessment based on time-limited analyses corresponding to 40 years. An extension of these analyses to the end of the period of extended operation, for example, 60 years, would be required. An IPA is not required and the existing FSAR

updating requirements apply when a time-limited analysis described in the FSAR is revised.

This alternative would require the lowest renewal expenditures. Aging management of systems, structures, and components, except for those addressed by time-limited analyses, would be addressed by the current regulatory process. Alternative 3 has a potential increase in accident risk when compared with the existing rule. The risk increase results from the NRC staff's conservative assumption that aging management activities in response to future regulatory actions regarding long-lived, passive equipment are not included in the averted risk estimate for the period of extended operation. Although the NRC staff believes that the current regulatory process could address aging effects of systems, structures, and components during the period of extended operation, the extent of these future activities has not been determined.

Alternative 2 was chosen as the preferred alternative by the Commission. The reliance on the maintenance rule and other existing licensee activities and programs for purposes of license renewal, which is absent from Alternative 1, directly focuses on systems, structures, and components subject to license renewal review. The systematic aging assessment, which is absent from Alternative 3, is warranted for the period of extended operation because of the importance of long-lived, passive, nonredundant systems, structures, and components. Alternative 2 shows a significant positive net value while maintaining a similar level of public health and safety to the existing rule. An approach similar to Alternative 2, but retaining the term ARDUTLR, was endorsed by industry organizations that are actively involved in license renewal activities.

As future regulatory actions are implemented, the associated aging management activities could be considered for managing the effects of aging during the period of extended operation. If the Commission decides that the specific regulatory actions are adequate in maintaining the function of equipment during the period of extended operation, the Commission may amend 10 CFR Part 54 to exclude that particular equipment from evaluation in a renewal application.

IX. Regulatory Flexibility Act Certification.

As required by the Regulatory Flexibility Act of 1980, (5 U.S.C. 605 (b)), the Commission certifies that this proposed rule, if adopted, would not have a significant economic impact upon a substantial number of small entities. The proposed rule sets forth the application procedures and the technical requirements for renewed operating licenses for nuclear power plants. Nuclear power plant licensees do not fall within the definition of small businesses as defined in Section 3 of the Small Business Act, 15 U.S.C., 632, the Small Business Size Standards of the Small Business Administration (13 CFR Part 121), or the Commission's Size Standards (56 FR 56671; November 6, 1991). Therefore, this proposed rule does not fall within the purview of the Act.

X. Non-Applicability of the Backfit Rule.

This proposed rule, like the original license renewal rule, addresses the procedural and technical requirements for obtaining a renewed operating

license for nuclear power plants. Although the proposed amendment constitutes a change to an existing regulation, the NRC has determined that the backfit rule, 10 CFR 50.109, does not apply because the proposed amendment only affects prospective applicants for license renewal. The primary impetus for the backfit rule was "regulatory stability." Once the Commission decides to issue a license, the terms and conditions for operating under that license would not be changed arbitrarily post hoc. As the Commission expressed in the preamble for 10 CFR Part 52, which prospectively changed the requirements for receiving design certifications, the backfit rule --

> [w]as not intended to apply to every regulatory action which changes settled expectations. Clearly, the backfit rule would not apply to a rule which imposed more stringent requirements on all future applicants for construction permits, even though such a rule might arguably have an adverse impact on a person who was considering applying for a permit but had not done so yet. In this latter case, the backfit rule protects the construction permit holder, but not the perspective applicant, or even the present applicant. (54 FR 15385-86; April 18, 1989).

Regulatory stability is not a relevant issue with respect to this proposed rule. There are no licensees currently holding renewed nuclear power plant operating licenses who would be affected by this rule. No applications for license renewal have been docketed. It is also unlikely that any license renewal application will be submitted before the proposed rule becomes effective because of implementation difficulties with the existing 10 CFR

Part 54 rule. Consequently, there are no valid licensee or applicant expectations that may be changed regarding the terms and conditions for obtaining a renewed operating license. Accordingly, this proposed rule does not constitute a "backfit" as defined in 10 CFR 50.109(a)(1).

Furthermore, one reason the Commission is proposing to amend 10 CFR Part 54 is because of the concerns of nuclear power plant licensees who are dissatisfied with the current requirements in 10 CFR Part 54 and have urged the Commission to modify the rule to address their concerns. Under this circumstance, the policy objective of the backfit rule would not be served by undertaking a backfit analysis. Regulatory and technical alternatives for addressing the concerns with the current 10 CFR Part 54 are being analyzed and considered in the regulatory analysis that has been prepared for this proposed rule. Preparation of a separate backfit statement would not provide any substantial additional benefit.

Therefore, the Commission has determined that a backfit analysis pursuant to 10 CFR 50.109 need not be prepared for this proposed rule.

List of Subjects

10 CFR Part 2

Administrative practice and procedure, Antitrust, Byproduct material, Classified information, Environmental protection, Nuclear materials, Nuclear power plants and reactors, Penalties, Sex discrimination, Source material, Special nuclear material, Waste treatment and disposal.

10 CFR Part 51

Administrative practice and procedure, Environmental impact statement, Nuclear materials, Nuclear power plants and reactors, Reporting and recordkeeping requirements.

10 CFR Part 54

Administrative practice and procedure, Aging, Effects of aging, Time-limited aging analyses, Backfitting, Classified information, Criminal penalties, Environmental protection, Nuclear power plants and reactors, Reporting and recordkeeping requirements.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, and 5 U.S.C. 552 and 553, the Commission is proposing to adopt the following amendments to 10 CFR Parts 2, 51, and 54.

PART 2 - RULES OF PRACTICE FOR DOMESTIC LICENSING PROCEEDINGS

1. The authority citation for Part 2 is revised to read as follows:

AUTHORITY: Secs. 161, 181, 68 Stat. 948, 953, as amended (42 U.S.C. 2201, 2231); sec. 191, as amended, Pub. L. 87-615, 76 Stat. 409 (42 U.S.C. 2241); sec. 201, 88 Stat. 1242, as amended (42 U.S.C. 5841); 5 U.S.C. 552.

Section 2.101 also issued under secs. 53, 62, 63, 81, 103, 104, 105, 68 Stat. 930, 932, 933, 935, 936, 937, 938, as amended (42 U.S.C. 2073, 2092, 2093, 2111, 2133, 2134, 2135); sec. 114(f), Pub. L. 97-425, 96 Stat. 2213, as amended (42 U.S.C. 10134(f)); sec. 102, Pub. L. 91-190, 83 Stat. 853, as amended (42 U.S.C. 4332); sec. 301, 88 Stat. 1248 (42 U.S.C. 5871). Sections 2.102, 2.103, 2.104, 2.105, 2.721 also issued under secs. 102, 103, 104, 105, 183, 189, 68 Stat. 936, 937, 938, 954, 955, as amended (42 U.S.C. 2132, 2133, 2134, 2135, 2233, 2239). Section 2.105 also issued under Pub. L. 97-415, 96 Stat. 2073 (42 U.S.C. 2239). Sections 2.200-2.206 also issued under secs. 161b, i, o, 182, 186, 234, 68 Stat. 948-951, 955, 83 Stat. 444, as amended (42 U.S.C. 2201(b), (i), (o), 2236, 2282); sec. 206, 88 Stat. 1246 (42 U.S.C. 5846). Sections 2.600-2.606 also issued under sec. 102, Pub. L. 91-190, 83 Stat. 853, as amended (42 U.S.C. 4332). Sections 2.700a, 2.719 also issued under 5 U.S.C. 554. Sections 2.754, 2.760, 2.770, 2.780, also issued under 5 U.S.C. 557. Section 2.764 and Table 1A of Appendix C are also issued under secs. 135, 141, Pub. L. 97-425, 96 Stat. 2232, 2241 (42 U.S.C. 10155, 10161). Section 2.790 also issued under sec. 103, 68 Stat. 936, as amended (42 U.S.C. 2133) and 5 U.S.C. 552. Sections 2.800 and 2.808 also issued under 5 U.S.C. 553. Section 2.809 also issued under 5 U.S.C. 553 and sec. 29, Pub. L. 85-256, 71 Stat. 579, as amended (42 U.S.C. 2039). Subpart K also

issued under sec. 189, 68 Stat. 955 (42 U.S.C. 2239); sec. 134, Pub. L. 97-425, 96 Stat. 2230 (42 U.S.C. 10154). Subpart L also issued under sec. 189, 68 Stat. 955 (42 U.S.C. 2239). Appendix A also issued under sec. 6, Pub. L. 91-560, 84 Stat. 1473 (42 U.S.C. 2135). Appendix B also issued under sec. 10, Pub. L. 99-240, 99 Stat. 1842 (42 U.S.C. 2021b et seq.).

2. In §2.758, paragraph (b)(1), (b)(2), and (b)(3) as combined into new paragraph (b); paragraph (e) is modified as folows:

§2.758 Consideration of Commission rules and regulations in adjudicatory proceedings

* * * * *

(b) A party to an adjudicatory proceeding involving initial or renewal licensing subject to this subpart may petition that the application of a specified Commission rule or regulation or any provision thereof, of the type described in paragraph (a) of this section, be waived or an exception made for the particular proceeding. The sole ground for petition for waiver or exception shall be that special circumstances with respect to the subject matter of the particular proceeding are such that the application of the rule or regulation (or provision thereof) would not serve the purposes for which the rule or regulation was adopted. The petition shall be accompanied by an affidavit that identifies the specific aspect or aspects of the subject matter of the proceeding as to which the application of the rule or regulation (or provision thereof) would not serve the purposes for which the rule or

regulation was adopted, and shall set forth with particularity the special circumstances alleged to justify the waiver or exception requested. Any other party may file a response thereto, by counteraffidavit or otherwise.

* * * * *

(e) Whether or not the procedure in paragraph (b) of this section is available, a party to an initial or renewal licensing proceeding may file a petition for rulemaking pursuant to § 2.802.

* * * * *

PART 51 - ENVIRONMENTAL PROTECTION REGULATIONS FOR DOMESTIC LICENSING AND RELATED REGULATORY FUNCTIONS

3. The authority citation for Part 51 continues to read as follows:

Authority: Sec 161, 68 Stat. 948, as amended (42 U.S.C. 2201); secs 201, as amended, 202, 88 Stat. 1242, as amended, 1244 (42 U.S.C. 5841, 5842). Subpart A also issued under National Environmental Policy Act of 1969, secs. 102, 104, 105, 83 Stat. 853-854, as amended (42 U.S.C. 4332,4334,4335); and Pub. L. 95-604, Title II, 92 Stat. 3033-3041; and sec. 193, Pub. L. 101-575, 104 Stat. 2835 42 U.S.C. 2243). Sections 51.20, 51.30, 51.60, 51.61, 51.80, and 51.97 also issued under secs. 135, 141, Pub. L. 97-425, 96 Stat. 2232, 2241, and sec. 148, Pub. L. 100-203, 101 Stat. 1330-223 (42 U.S.C. 10155,

10161, 10168). Section 51.22 also issued under sec. 274,73 Stat. 688, as amended by 92 Stat. 3036-3038 (42 U.S.C. 2021) and under Nuclear Waste Policy Act of 1982, sec. 121, 96 Stat. 2228 (42 U.S.C. 10141). Sections 51.43, 51.67, and 51.109 also under Nuclear Waste Policy Act of 1982, sec. 114(f), 96 Stat. 2216, as amended (42U.S.C. 10134(f)).

4. In §51.22, paragraph (c)(3) is revised to read as follows:

§51.22 Criterion for categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review.

* * * * *

(c) * * *

(3) Amendments to Parts 20, 30, 31, 32, 33, 34, 35, 39, 40, 50, 51, 54, 60, 61, 70, 71, 72, 73, 74, 81 and 100 of this chapter which relate to --

(i) Procedures for filing and reviewing applications for licenses or construction permits or other forms of permission or for amendments to or renewals of licenses or construction permits or other forms of permission;

(ii) Recordkeeping requirements; or

(iii) Reporting requirements; and

(iv) Actions on petitions for rulemaking relating to these amendments.

5. Part 54 is revised to read as follows:

* * * * *

PART 54 - REQUIREMENTS FOR RENEWAL OF OPERATING LICENSES FOR NUCLEAR POWER PLANTS

General Provisions

Sec.

Authority: Secs. 102, 103, 104, 161, 181, 182, 183, 186, 189, 68 Stat. 936, 937, 938, 948, 953, 954, 955, as amended, sec. 234, 83 Stat. 1244, as amended (42 U.S.C. 2132, 2133, 2134, 2135, 2201, 2232, 2233, 2236, 2239, 2282); secs. 201, 202, 206, 88 Stat. 1242, 1244, as amended (42 U.S.C. 5841, 5842).

§54.1 Purpose.

This part governs the issuance of renewed operating licenses for nuclear power plants licensed pursuant to Sections 103 or 104b of the Atomic Energy Act of 1954, as amended (68 Stat. 919), and Title II of the Energy Reorganization Act of 1974 (88 Stat. 1242).

§54.3 Definitions.

(a) As used in this part,

Current licensing basis (CLB) is the set of NRC requirements applicable to a specific plant and a licensee's written commitments for ensuring compliance with and operation within applicable NRC requirements and the plant-specific design basis (including all modifications and additions to such commitments over the life of the license) that are docketed and in effect. The CLB includes the NRC regulations contained in 10 CFR Parts 2, 19, 20, 21, 26, 30, 40, 50, 51, 54, 55, 70, 72, 73, 100 and appendices thereto; orders; license conditions; exemptions; and technical specifications. It also includes the plant-specific design-basis information defined in 10 CFR 50.2 as documented in the most recent final safety analysis report (FSAR) as required by 10 CFR 50.71 and the licensee's commitments remaining in effect that were made in docketed licensing correspondence such as licensee responses to NRC bulletins, generic letters, and enforcement actions, as well as licensee commitments documented in NRC safety evaluations or licensee event reports.

Integrated plant assessment (IPA) is a licensee assessment that demonstrates that a nuclear power plant facility's structures and components requiring aging management review in accordance with §54.21(a) for license renewal have been identified and that the effects of aging on the functionality of such structures and components will be managed to maintain the CLB such that there is an acceptable level of safety during the period of extended operation.

Nuclear power plant means a nuclear power facility of a type described in 10 CFR 50.21(b) or 50.22.

Time-limited aging analyses, for the purposes of this part, are those licensee calculations and analyses that form the basis for a licensee conclusion regarding the capability of systems, structures, and components within the scope of this part to perform their intended function(s) that --

(1) Consider the effects of aging; and

(2) Are based on explicit assumptions defined by the current operating term of the plant.

(b) All other terms in this part have the same meanings as set out in 10 CFR 50.2 or Section 11 of the Atomic Energy Act, as applicable.

§54.4 Scope.

(a) Plant systems, structures, and components within the scope of this part are --

(1) Safety-related systems, structures, and components which are those relied upon to remain functional during and following design-basis events (as defined as in 10 CFR 50.49 (b)(1)) to ensure the following functions --

(i) The integrity of the reactor coolant pressure boundary;

(ii) The capability to shut down the reactor and maintain it in a safe shutdown condition; or

(iii) The capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposure comparable to the 10 CFR Part 100 guidelines.

(2) All nonsafety-related systems, structures, and components whose failure could prevent satisfactory accomplishment of any of the functions identified in paragraphs (a)(1)(i), (ii), or (iii) of this section.

(3) All systems, structures, and components relied on in safety analyses or plant evaluations to perform a function that demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), pressurized thermal shock (10 CFR 50.61), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63).

(4) All systems, structures, and components subject to operability requirements contained in the facility technical specification-limiting conditions for operation.

(b) The intended functions that these systems, structures, and components must be shown to fulfill in §54.21 are those functions that are the bases for including them within the scope of license renewal as specified in paragraphs (a)(1)-(4) of this section.

§54.5 Interpretations.

Except as specifically authorized by the Commission in writing, no interpretation of the meaning of the regulations in this part by any officer or employee of the Commission other than a written interpretation by the General Counsel will be recognized to be binding upon the Commission.

§54.7 Written communications.

All applications, correspondence, reports, and other written communications shall be filed in accordance with applicable portions of 10 CFR 50.4.

§54.9 Information collection requirements: OMB approval.

(a) The Nuclear Regulatory Commission has submitted the information collection requirements contained in this part to the Office of Management and Budget (OMB) for approval as required by the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.). OMB has approved the information collection requirements contained in this part under control number XXXX-XXXX.

(b) The approved information collection requirements contained in this part appear in §§54.13, 54.17, 54.19, 54.21, 54.22, 54.23, and 54.37.

§54.11 Public inspection of applications.

Applications and documents submitted to the Commission in connection with renewal applications may be made available for public inspection in accordance with the provisions of the regulations contained in 10 CFR Part 2.

§54.13 Completeness and accuracy of information.

(a) Information provided to the Commission by an applicant for a renewed license or information required by statute or by the Commission's regulations, orders, or license conditions to be maintained by the applicant must be complete and accurate in all material respects.

(b) Each applicant shall notify the Commission of information identified by the applicant as having for the regulated activity a significant implication for public health and safety or common defense and security. An applicant violates this paragraph only if the applicant fails to notify the Commission of information that the applicant has identified as having a significant implication for public health and safety or common defense and security. Notification must be provided to the Administrator of the appropriate regional office within 2 working days of identifying the information. This requirement is not applicable to information that is already required to be provided to the Commission by other reporting or updating requirements.

§54.15 Specific exemptions.

Exemptions from the requirements of this part may be granted by the Commission in accordance with 10 CFR 50.12.

§54.17 Filing of application.

(a) The filing of an application for a renewed license must be in accordance with Subpart A of 10 CFR Part 2 and 10 CFR 50.4 and 50.30.

(b) Any person who is a citizen, national, or agent of a foreign country, or any corporation, or other entity which the Commission knows or has reason to know is owned, controlled, or dominated by an alien, a foreign corporation, or a foreign government, is ineligible to apply for and obtain a renewed license.

(c) An application for a renewed license may not be submitted to the Commission earlier than 20 years before the expiration of the operating license currently in effect.

(d) An applicant may combine an application for a renewed license with applications for other kinds of licenses.

(e) An application may incorporate by reference information contained in previous applications for licenses or license amendments, statements, correspondence, or reports filed with the Commission, provided that the references are clear and specific.

(f) If the application contains Restricted Data or other defense information, it must be prepared in such a manner that all Restricted Data and other defense information are separated from unclassified information in accordance with 10 CFR 50.33(j).

(g) As part of its application and in any event prior to the receipt of Restricted Data or the issuance of a renewed license, the applicant shall agree in writing that it will not permit any individual to have access to Restricted Data until an investigation is made and reported to the Commission on the character, association, and loyalty of the individual and the Commission shall have determined that permitting such persons to have access to Restricted Data will not endanger the common defense and security. The agreement of the applicant in this regard is part of the renewed license, whether so stated or not.

§54.19 Contents of application - general information.

(a) Each application must provide the information specified in 10 CFR 50.33(a) through (e), (h), and (i). Alternatively, the application may incorporate by reference other documents that provide the information required by this section.

(b) Each application must include conforming changes to the standard indemnity agreement, 10 CFR 140.92, Appendix B, to account for the expiration term of the proposed renewed license.

§54.21 Contents of application - technical information.

Each application must contain the following information:

(a) An integrated plant assessment (IPA). The IPA must --

(1) For those systems and structures within the scope of this part, as delineated in §54.4, identify and list those structures and components subject to an aging management review. Structures and components subject to an aging management review shall encompass those structures and components --

(i) That perform an intended function, as described in §54.4, without moving parts or without a change in configuration or properties. These structures and components include, but are not limited to, pressure retaining boundaries, component supports, reactor coolant pressure boundaries, the reactor vessel, core support structures, containment, seismic Category I structures, electrical cables and connections, and electrical penetrations, excluding, but not limited to, pumps (except casing), valves (except body), motors, batteries, relays, breakers, and transistors; and

(ii) Whose failure would result in loss of intended system or structure function as described in §54.4(b) during the period of extended operation; and

(iii) That are not subject to replacement based on a qualified life or specified time period.

(2) Describe and justify the methods used in paragraph (a)(1) of this section.

(3) For each structure and component identified in paragraph (a)(1) of this section, demonstrate that the effects of aging will be managed so that the intended function(s) will be maintained for the period of extended operation.

(b) CLB changes during NRC review of application. Each year following submittal of the license renewal application and at least 3 months before scheduled completion of the NRC review, an amendment to the renewal application must be submitted that identifies any change to the CLB of the facility that materially affects the contents of the license renewal application, including the FSAR supplement.

(c) An evaluation of time-limited aging analyses.

(1) A list of time-limited aging analyses, as defined in §54.3, must be provided. The applicant shall demonstrate that --

(i) The analyses remain valid for the period of extended operation;

(ii) The analyses have been projected to the end of the period of extended operation; or

(iii) The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.

(2) A list must be provided of all plant-specific exemptions granted pursuant to 10 CFR 50.12. For exemptions that are based on time-limited aging analyses as defined in §54.3, the applicant shall provide an evaluation that justifies the continuation of these exemptions for the period of extended operation.

(d) An FSAR supplement. The FSAR supplement for the facility must contain a summary description of the programs and activities for managing the effects of aging for the period of extended operation determined by paragraphs (a) and (c) of this section.

§54.22 Contents of application - technical specifications.

Each application must include any technical specification changes or additions necessary to manage the effects of aging during the period of extended operation as part of the renewal application. The technical justification for these changes or additions must be contained in the FSAR supplement submitted to support license renewal.

§54.23 Contents of application - environmental information.

Each application must include an environmental report that complies with the requirements of Subpart A of 10 CFR Part 51.

§54.25 Report of the Advisory Committee on Reactor Safeguards.

Each renewal application will be referred to the Advisory Committee on Reactor Safeguards for a review and report. Any report will be made part of the record of the application and made available to the public, except to the extent that security classification prevents disclosure.

§54.27 Hearings.

A notice of an opportunity for a hearing will be published in the Federal Register in accordance with 10 CFR 2.105. In the absence of a request for a hearing filed within 30 days by a person whose interest may be affected, the Commission may issue a renewed operating license without a hearing upon 30-day notice and publication once in the Federal Register of its intent to do so.

§54.29 Standards for issuance of a renewed license.

(a) A renewed license may be issued by the Commission up to the full term authorized by §54.31 based on the following findings:

(1) Actions have been identified and have been or will be taken with respect to --

(i) Managing the effects of aging during the period of extended operation on the functionality of structures and components that have been identified to require review in accordance with §54.21(a)(1); and

(ii) Evaluating time-limited aging analyses that have been identified to require review in accordance with §54.21(c);

such that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the CLB and that any changes made to the plant's CLB in order to comply with this paragraph are otherwise in accord with the Act and the Commission's regulations.

(2) Any applicable requirements of Subpart A of 10 CFR Part 51 have been satisfied.

(3) Any matters raised under §2.758 have been addressed.

(b) The licensee shall comply with the requirements specified in paragraph (b)(2) of this section if the reviews required by §54.21 show that either --

(1) Aging will cause a loss of function of those structures or components that are reviewed in §54.21(a)(3) so that there is not reasonable assurance during the current license term that licensed activities will be conducted in accordance with the CLB; or

(2) The time-limited aging analyses reviewed in §54.21(c) are not sufficient to provide reasonable assurance during the current license term that licensed activities will be conducted in accordance with the CLB.

(c) As determined by paragraph (b) of this section, the licensee shall take measures under its current license to ensure that the intended function of those structures or components will be maintained in accordance with the CLB throughout the term of the current license. The adequacy of the measures for the term of the current license shall not be subject to challenge as a part of the renewal review or hearing under Part 54, but may be raised in a petition filed under 10 CFR 2.206.

§54.31 Issuance of a renewed license.

(a) A renewed license will be of the class for which the operating license currently in effect was issued.

(b) A renewed license will be issued for a fixed period of time, which is the sum of the additional amount of time beyond the expiration of the operating license (not to exceed 20 years) that is requested in a renewal application plus the remaining number of years on the operating license currently in effect. The term of any renewed license may not exceed 40 years.

(c) A renewed license will become effective immediately upon its issuance, thereby superseding the operating license previously in effect. If a renewed license is subsequently set aside upon further administrative or judicial appeal, the operating license previously in effect will be reinstated unless its term has expired and the renewal application was not filed in a timely manner.

(d) A renewed license may be subsequently renewed in accordance with all applicable requirements.

§54.33 Continuation of CLB and conditions of renewed license.

(a) Whether stated therein or not, each renewed license will contain and otherwise be subject to the conditions set forth in 10 CFR 50.54.

(b) Each renewed license will be issued in such form and contain such conditions and limitations, including technical specifications, as the Commission deems appropriate and necessary to help ensure that systems, structures, and components subject to review in accordance with §54.21(a) will continue to perform their intended functions for the period of extended operation. In addition, the renewed license will be issued in such form and contain such conditions and limitations as the Commission deems appropriate and necessary to help ensure that systems, structures, and components associated with any time-limited aging analyses will continue to perform their intended functions for the period of extended operation.

(c) Each renewed license will include those conditions to protect the environment that were imposed pursuant to 10 CFR 50.36(b) and that are part of the CLB for the facility at the time of issuance of the renewed license. These conditions may be supplemented or amended as necessary to protect the environment during the term of the renewed license and will be derived from information contained in the supplement to the environmental report submitted pursuant to 10 CFR Part 51, as analyzed and evaluated in the NRC record of decision. The conditions will identify the obligations of the licensee in the

environmental area, including, as appropriate, requirements for reporting and recordkeeping of environmental data and any conditions and monitoring requirements for the protection of the nonaquatic environment.

(d) The licensing basis for the renewed license includes the CLB, as defined in §54.3(a); the inclusion in the licensing basis of matters such as licensee commitments does not change the legal status of those matters unless specifically so ordered pursuant to paragraphs (b) or (c) of this section.

§54.35 Requirements during term of renewed license.

During the term of a renewed license, licensees shall be subject to and shall continue to comply with all Commission regulations contained in 10 CFR Parts 2, 19, 20, 21, 26, 30, 40, 50, 51, 54, 55, 70, 72, 73, and 100, and the appendices to these parts that are applicable to holders of operating licenses.

§54.37 Additional records and recordkeeping requirements.

(a) The licensee shall retain in an auditable and retrievable form for the term of the renewed operating license all information and documentation required by, or otherwise necessary to document compliance with, the provisions of this part.

(b) After the renewed license is issued, the FSAR update required by 10 CFR 50.71(e) must include any structures and components newly identified that would have been subject to an aging management review in accordance with

§54.21. This FSAR update must describe how the effects of aging will be managed such that the intended function(s) in §54.4(b) will be effectively maintained during the period of extended operation.

§54.41 Violations.

(a) The Commission may obtain an injunction or other court order to prevent a violation of the provisions of the following Acts --

(1) The Atomic Energy Act of 1954, as amended.

(2) Title II of the Energy Reorganization Act of 1974, as amended or

(3) A regulation or order issued pursuant to those Acts.

(b) The Commission may obtain a court order for the payment of a civil penalty imposed under section 234 of the Atomic Energy Act --

(1) For violations of the following --

(i) Sections 53, 57, 62, 63, 81, 82, 101, 103, 104, 107, or 109 of the Atomic Energy Act of 1954, as amended;

(ii) Section 206 of the Energy Reorganization Act;

(iii) Any rule, regulation, or order issued pursuant to the sections specified in paragraph (b)(1)(i) of this section;

(iv) Any term, condition, or limitation of any license issued under the sections specified in paragraph (b)(1)(i) of this section.

(2) For any violation for which a license may be revoked under Section 186 of the Atomic Energy Act of 1954, as amended.

§54.43 Criminal penalties.

(a) Section 223 of the Atomic Energy Act of 1954, as amended, provides for criminal sanctions for willful violations of, attempted violation of, or conspiracy to violate, any regulation issued under sections 161b, 161i, or 161o of the Act. For purposes of section 223, all the regulations in Part 54 are issued under one or more of sections 161b, 161i, or 161o, except for the sections listed in paragraph (b) of this section.

(b) The regulations in Part 54 that are not issued under sections 161b, 161i, or 161o for the purposes of section 223 are as follows: §§54.1, 54.3, 54.4, 54.5, 54.7, 54.9, 54.11, 54.15, 54.17, 54.19, 54.21, 54.22, 54.23, 54.25, 54.27, 54.29, 54.31, 54.41, and 54.43.

Dated at Rockville, Maryland, this _____ day of _____, 1994.

_____

Samuel J. Chilk,

Secretary of the Commission

Enclosure 3

ENCLOSURE 3

ENVIRONMENTAL ASSESSMENT FOR AMENDMENT OF 10 CFR PART 54 REQUIREMENTS FOR RENEWAL OF OPERATING LICENSES FOR NUCLEAR POWER PLANTS

by

JOHN P. MOULTON

OFFICE OF NUCLEAR REACTOR REGULATION

U.S. NUCLEAR REGULATORY COMMISSION

May 1994

ENVIRONMENTAL ASSESSMENT FOR
AMENDMENT OF 10 CFR PART 54
REQUIREMENTS FOR RENEWAL OF OPERATING LICENSES
FOR NUCLEAR POWER PLANTS

Introduction

The Nuclear Regulatory Commission (NRC) is amending its regulations in Part 54, "Requirements for Renewal of Operating Licenses for Nuclear Power Plants" of Title 10 of the Code of Federal Regulations (10 CFR). In fulfillment of the National Environmental Policy Act (NEPA) of 1969 and 10 CFR Part 51, the NRC must consider the impacts on the environment from the promulgation of this amendment. The purpose of this environmental assessment (EA) is to provide an evaluation of these impacts and to determine whether an environmental impact statement (EIS) needs to be prepared in support of this amended rule.

Description of Proposed Action

The proposed action is an amendment to 10 CFR Part 54, which sets forth the procedures and requirements for utilities submitting license renewal applications and provides standards for the NRC staff review and approval of these applications. The amendment would modify the license renewal review methodology and standard for issuance of a renewal license, as follows:

(1) License renewal applicants will be permitted to focus on the management of aging effects, as opposed to identification and evaluation of individual aging mechanisms. Consequently, this change focuses the aging management review on ensuring the functions of important structures and components, since aging degradation effects are manifested by degraded performance or condition and ultimately loss of function. A related and conforming change resulting from this focus on functionality includes deleting the definition of "aging mechanisms."

(2) The Commission's view on the concept of age-related degradation unique to license renewal (ARDUTLR) is clarified as being that situation whereby the functionality of systems, structures, and components may not be adequately ensured in the renewal period despite the continuation of the existing situation, including programs and activities for managing the effects of aging. Furthermore, on the basis of the Commission's further consideration of the aging management capabilities of current programs and activities, this change more narrowly defines the scope of systems, structures, and components whose function may not be ensured during the period of extended operation and that require review for renewal. Additionally, because of its confusing nature, the term and current definition of "ARDUTLR" have been deleted from the rule, although the concept as clarified above remains.

(3) The integrated plant assessment (IPA) specified in 10 CFR 54.21(a), which the applicant must implement in order to determine if additional actions are necessary to manage the effects of aging during the period of extended operation, is simplified. Related and conforming changes to

this revised IPA include a revised definition of IPA and deletion off the term "effective program."

Additionally, the requirements of 10 CFR 54.21(c) have been combined into a new section, 10 CFR 54.21(c), "An evaluation of time-limited aging analyses," while paragraphs (b) and (d) have been deleted. The requirement of 10 CFR 54.21(e) has been relocated to a new paragraph (b), and a new section 54.21(d) dealing with final safety analysis report (FSAR) supplement requirements has been added. Specifically, the amended IPA in Section 54.21(a) would

(i) Combine the screening of systems, structures, and components important to license renewal of the former Section 54.21(a)(1), the functional screening of Section 54.21(a)(2), and the screening of systems, structures, and components requiring review for license renewal of Section 54.21(a)(3) (i.e., ARDUTLR screening) into one step that both screens systems, structures, and components that are within the "scope" of the rule as identified in proposed new Section 54.4, "Scope," and determines which systems, structures, and components require review for license renewal. This step would establish that systems, structures, and components require review for license renewal if

- (i) they are not routinely replaced based on a qualified service life or a specified time interval
- (ii) they perform "passive" functions (as described in the rule)
- (iii) their failure would directly result in a loss of intended system or structure function during the extended period of operation

(ii) Eliminate the requirement of Section 54.21(a)(5) for a demonstration that age-related degradation unique to license renewal be either addressed through an "effective program" or need not be addressed. Additionally, Section 54.21(a)(6) delineating the contents of an "effective" program has been deleted. Paragraphs (a)(5) and (a)(6) have been replaced with Section 54.21(a)(3) which requires, for systems, structures, and components that require review for license renewal, a demonstration that their intended functions will be maintained for the extended period of operation, in accordance with the current licensing basis.

(4) A new section, Section 54.4, "Scope", has been added to replace the definition of "systems, structures, and components important to license renewal." This section is consistent with the original important-to-license-renewal scope.

(5) A new section, Section 54.21(c), "Time-Limited Aging Analyses," has been added to specifically require a review of licensee calculations and analyses that were intended to provide margin to the effects of aging and were based on an explicit assumption directly related to the current operating life of the plant. This is a conforming change to the deletion of the definition of ARDUTLR, which previously provided for the review of such time-limited analyses.

(6) Section 54.22, "Contents of application - technical specification," has been changed to be consistent with the changes described above.

(7) Section 54.29, "Standards for Issuance of a Renewed License," has been changed to reflect the changes described above.

(8) Paragraph (b) of Section 54.33, "Continuation of Current Licensing Basis and Conditions of a Renewed License," has been changed to delete all reference to ARDUTLR.

In addition to these changes, the amended rule would contain administrative changes that relate to recordkeeping or reporting requirements. These changes are categorically excluded from environmental review in accordance with the Commission's regulations in Section 51.22(c)(3) and will not be the focus of this environmental assessment. The following are the proposed changes subject to categorical exclusion:

- deletion of Paragraph (d) of Section 54.33 pertaining to licensee recordkeeping and reporting requirements for renewal applications

- simplification of paragraph (b) and elimination of paragraph (c) of Section 54.37, "Additional Records and Recordkeeping Requirements"

Need for Proposed Action

Since promulgation of the license renewal rule on December 13, 1991, the staff and the nuclear power industry have both initiated activities to identify an effective implementation approach for the rule. Information developed under the lead plant program (Monticello and Yankee Rowe) sponsored by the Department of Energy and the Electric Power Research Institute (EPRI) has been considered, as well as a review of NUMARC-sponsored industry reports, and most recently, through interaction with the Baltimore Gas and Electric Company and the Babcock and Wilcox Owners Group. In general, these interactions with the industry have shown that, without additional implementation guidance or amendment of the rule, the current process may extend beyond the original intent of the license renewal rule, may be too burdensome, and may not provide a stable and predictable regulatory process for license renewal. Specifically, these interactions revealed that the current license renewal rule

(1) unnecessarily focused on analyzing aging "mechanisms" when instead managing the "effects" of age-related degradation is acceptable in ensuring that structures and components perform their intended function

(2) contained a definition of ARDUTLR that was confusing and did not appropriately focus the license renewal review on those systems, structures, and components whose functions might not be adequately managed in the renewal period, despite the continuation of the existing situation, including any programs and activities for managing the effects of aging

(3) did not sufficiently recognize and credit the actions required by the maintenance rule (10 CFR 50.65) and other existing licensee programs and activities that may be relied on to generically determine that certain structures and components will be adequately managed in the renewal term so that their functions are maintained in accordance with the current licensing basis

(4) required a level of detail in the license renewal application and final safety analysis report supplement beyond that necessary to make a safety finding and required unnecessary reporting and recordkeeping requirements

Therefore, the NRC believes that a revision to the current license renewal rule is desirable

- to promote regulatory stability and predictability

- to ensure that the license renewal process is efficient and effective and not unnecessarily burdensome to the renewal applicant

- to ensure that the license renewal process focuses on only those structures and components whose intended functions may not be adequately ensured, taking into consideration the current regulatory process and existing aging management programs

Environmental Impacts of Proposed Action

The staff has considered how environmental impacts from license renewal under the proposed action (i.e., amended 10 CFR Part 54) might differ from environmental impacts that might occur with license renewal under the current 10 CFR Part 54. The NRC staff previously assessed the environmental impacts of the promulgation of 10 CFR Part 54 in NUREG-1398, "Environmental Assessment for Final Rule on Nuclear Power Plant License Renewal." In this assessment, the staff concluded that the promulgation of 10 CFR Part 54 will have no significant impact on the environment.

In analyzing the environmental impact of the proposed action compared to that of the current rule, the staff has concentrated primarily on license renewal review methodology changes (1), (2), and (3) as delineated in the "Description of the Proposed Action" above. These three changes capture the essence of the proposed action, while the remainder are conforming changes.

- Methodology Change 1

The first license renewal review methodology change is the establishment of a clear focus on managing the functionality of structures and components in the face of detrimental aging effects as opposed to the identification and mitigation of aging mechanisms. The Commission has concluded that the focus on the identification of aging mechanisms is not necessary because, regardless of the aging mechanism, only those that lead to degraded component performance or condition (i.e., potential loss of functionality) are of concern. Therefore, the Commission has concluded that an aging management review that seeks to ensure a component's functionality is a more efficient and appropriate review. Since this change only improves the efficiency of the licensee's aging management review, the environmental impacts would be similar to those under the current rule.

- Methodology Changes 2 and 3

The second license renewal review methodology change is the deletion of the term and definition of "ARDUTLR." However, the Commission's original concept that the review should focus on ensuring against the detrimental effects of aging that are of regulatory interest solely in the extended period of operation is retained and clarified. Further, this change effectively narrows the scope of the license renewal review based on the Commission's recent experience with aging management reviews. The concept of ARDUTLR is clarified to be that situation whereby the functionality of systems, structures, and components may not be adequately ensured in the extended period of operation despite the existing situation, including any programs and activities for managing the effects of aging. Further, the scope of those structures and components requiring review for license renewal includes only those (1) that have passive characteristics, (2) that are not routinely replaced on the basis of performance or condition monitoring or a specified time interval, and (3) whose failure would directly result in a loss of the intended function of the system or structure during the extended period of operation (hereafter referred to as "passive, long-lived, nonredundant"). The third methodology change simplifies the integrated plant assessment (IPA) which a licensee determines which structures and components are subject to a license renewal review and if additional activities are needed to manage the effects of aging.

The requirements for a renewed license under both the current rule and the proposed amendment are similar. Both approaches would result in operation of plants up to 20 years beyond the expiration of the initial license, and there would be an emphasis on certain systems, structures, and components undergoing a specific aging management review to provide assurance that aging effects are adequately managed, thus ensuring functionality during the extended period of operation. Under both approaches, license renewal applicants must screen plant systems, structures, and components through an IPA to determine which systems, structures, and components will be subject to a license renewal review and then determine whether additional programs are required to manage aging effects so that equipment function is maintained.

The principal differences between the proposed action and the current rule is in (1) the screening of systems, structures, and components to identify those which must undergo a specific aging management review and (2) the form of this aging management review. The latter, the form of the aging management review, has already been discussed in the discussion of the first methodology change above wherein the Commission concluded that an aging management review that seeks to ensure a component's functionality is a more efficient and appropriate review. In the former, the screening of systems, structures, and components that must be further reviewed, the proposed amendment effectively narrows the scope of systems, structures, and components subject to detailed review.

In general, the current rule contains a definition of ARDUTLR that would cause many systems, structures, and components to require further aging management review but would allow existing licensee programs and activities (including the maintenance rule) to serve as a basis for concluding that ARDUTLR will be adequately managed in the extended period of operation. In contrast, the proposed amendment would retain the screening of systems, structures, and components but would reduce the scope of systems, structures, and components requiring review to a narrowly defined group of systems, structures, and components based on an NRC determination in this rulemaking of the effectiveness of current licensee programs and NRC requirements that would continue into the extended period of operation.

Commission experience with the recent rule implementation revealed that the maintenance rule, other existing programs, and NRC's regulatory process provide an acceptable rationale for generically concluding that many structures and components will be adequately managed in the renewal period. However, this generic conclusion could not be reached for a certain subset of structures and components. As a general statement these systems, structures, and components are those for which the detrimental effects of aging are sufficiently less apparent via degraded performance or condition indicators, and are highly risk significant. The Commission has concluded, therefore, that detailed reviews should only be undertaken on this subset of structures and components. It has determined from its implementation experience that these systems, structures, and components are those passive, long-lived, nonredundant systems, structures, and components.

Thus, since the proposed amendment has essentially the same results with respect to management of aging effects in the extended period of operation as the current rule, but provides a more efficient process to achieve these results, the environmental impacts of the proposed amendment would be similar to those under the current rule. It should be noted, however, that under the proposed rule an applicant need not include a projection of future aging effects and any corresponding mitigation activities (major refurbishment or other plant changes) for the renewal period. Instead, the focus is on assuring that programs are in place to identify and mitigate aging effects as they occur. As a result, this environmental assessment was limited to licensee activities required to put in place any relevant aging management programs rather than a review of any future mitigation activities that may be required under these programs.

Additional Alternatives Considered

In addition to the proposed amendment, the following alternatives were evaluated, consistent with those evaluated in the regulatory analysis for the proposed amendment to 10 CFR Part 54 dated (MMYYDD):

- license renewal using the current 10 CFR Part 54 (i.e., no action)

- license renewal rule amended to focus only on time-limited issues

Environmental Impacts of Alternatives to Proposed Action

(1) No Action

The environmental impacts of the no action alternative--maintaining the current rule--have been analyzed in NUREG-1398, "Environmental Assessment for Final Rule on Nuclear Power Plant License Renewal." In this assessment, the Commission concluded that the promulgation of 10 CFR Part 54 will have no significant impact on the environment. In the above comparison of the proposed action with the current rule, the Commission concluded that the current rule and proposed rule would have similar environmental impacts.

(2) Time-Limited Review Only

Under the alternative that focuses only on time-limited issues, a licensee would only need to reconcile its calculations and analyses that were based on explicit time limits related to the current operating life of the plant. These time-limited issues would be required to be shown valid for the extended period. Since this is also required under the proposed rule and current rule, the actions a licensee would take related to time-limited issues are the same and, therefore, the associated environmental impacts are expected to be similar. Under this alternative, however, there would be no specific requirements for plant review of aging management, or programs of enhanced inspection, surveillance, testing, and monitoring (ISTM) for long-lived, passive, nonredundant systems, structures, and components as a condition for license renewal (unless they happen to involve a time-limited analysis). Enhancements to ISTM would occur only in response to the current regulatory process, such as under the maintenance rule and existing programs. The environmental impacts associated with these activities is expected to be similar to those experienced during other maintenance or replacement activities conducted during the previous operation of the plant.

Under this alternative, the regulatory analysis shows that there may be a slight increase in risk of severe accidents because of lack of an explicit systematic aging assessment of passive, long-lived, nonredundant systems, structures, and components. However, there are large uncertainties in risk estimates and the difference is judged to be well within the associated uncertainties.

FINDING OF NO SIGNIFICANT IMPACT

The environmental impacts of activities under the current rule were previously analyzed in NUREG-1398, "Environmental Assessment for Final Rule on Nuclear Power Plant License Renewal," and were determined to have no significant impact on the human environment. The staff has reviewed the differences in the requirements for license renewal under the proposed action and under the current rule, 10 CFR Part 54, and the environmental significance of these differences. Both approaches would emphasize managing equipment functionality in the face of age-related degradation in the renewal period and would result in similar activities in this regard. Therefore, the Commission has concluded that the proposed amendment will have no significant impact on the environment and a full environmental impact statement is not required.

Enclosure 4

ENCLOSURE 4

REGULATORY ANALYSIS:

FOR THE PROPOSED RULE ON

NUCLEAR POWER PLANT LICENSE RENEWAL ---

10 CFR PART 54

by

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U. S. NUCLEAR REGULATORY COMMISSION

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1. STATEMENT OF THE PROBLEM AND OBJECTIVE

The Commission promulgated the license renewal rule (10 CFR Part 54) in December 1991 (Reference 1). Since the rule was published, the NRC staff and the nuclear industry have worked to effectively implement the license renewal requirements. However, comments from the industry indicated that, without additional implementation guidance or rule amendment, the current license renewal process may extend beyond the original intent of the license renewal rule, may be too burdensome, and may not provide a stable and predictable regulatory process for license renewal. Policy issues have been identified which may best be resolved through rulemaking, including the integration of the maintenance rule (10 CFR 50.65) and the license renewal rule.

The objective of the proposed action is to clarify the Commission's requirements for license renewal and to provide greater reliance on the maintenance rule and other existing licensee activities and programs for purposes of license renewal.

1.1 Background of the Problem

The license renewal rule is based on two key principles. The first principle is that the regulatory process is adequate to ensure that the licensing basis of all currently operating plants provides an acceptable level of safety, with the exception of age-related degradation unique to license renewal (ARDUTLR). The second principle is that each plant's current licensing basis (CLB) is required to be maintained during the period of extended operation including management of aging of systems, structures, and components (SSCs) that are important to license renewal (ITLR).

Since publication of the license renewal rule, a number of significant policy issues have been identified including the question of whether the maintenance and license renewal rules can be integrated further, the appropriate scope of the license renewal rule, and the appropriate interpretation of ARDUTLR. The NRC staff in SECY-93-049 and SECY-93-113 (References 2 and 3) proposed approaches for implementing the license renewal rule to resolve industry concerns about the definition of ARDUTLR and the integrated plant assessment (IPA) process and discussed the resolution of a variety of other issues the industry has identified. After considering the NRC staff proposals, the Commission directed the staff to convene a public workshop to examine the extent to which greater reliance can be placed on the maintenance rule and other existing licensee activities and programs for purposes of license renewal (Reference 4). The NRC staff held the workshop on September 30, 1993 (Reference 5). The Commission also received written public comments after the workshop (References 6 through 11).

In SECY-93-331 (Reference 12), the NRC staff summarized the results of the workshop and presented its conclusions and proposals regarding an approach to license renewal that allows greater credit for existing licensee programs and maintenance rule requirements in the license renewal process. After considering the NRC staff's recommendations, the Commission agreed with the

NRC staff's conceptual approach for performing license renewal reviews. The Commission directed the NRC staff to proceed with rulemaking and recommended eliminating the term ARDUTLR and further simplifying the rule (Reference 13).

1.2 Backfit Rule Concerns

Although the proposed amendment to 10 CFR Part 54 constitutes a change to an existing regulation, the NRC has determined that the backfit rule, 10 CFR 50.109, does not apply because the proposed amendment only affects prospective applicants for license renewal. There are no licensees currently holding a renewed operating plant license who would be affected by the rule. No applications for license renewal have been docketed and it is unlikely that any license renewal applications will be submitted before the proposed rule becomes effective because of the implementation difficulties with the existing Part 54 rule.

In addition, the proposed rule amendment results in reducing the regulatory burden on the licensee while maintaining a similar level of protection of public health and safety. Thus, the proposed rule amendment to Part 54 does not constitute a "backfit" as defined in Section 50.109(a)(1) of the backfit rule; similarly, the amendment is not subject to the safety goal evaluation (Reference 14).

2. IDENTIFICATION AND PRELIMINARY ANALYSIS OF ALTERNATIVE APPROACHES

The alternatives considered included:

1. Implement existing rule using SECY-93-049 and SECY-93-113 (References 2 and 3) as guidance.

2. Amend the existing rule to focus on long-lived passive non-redundant SSCs and SSCs with time-limited analyses according to SECY-93-331 (Reference 12) and the Commission's staff requirements memorandum (Reference 13).

3. Amend the existing rule to focus on SSCs with time-limited analyses according to the NRC staff's "Option 4" discussed at the workshop (Reference 5).

Alternative 1 (the existing rule) requires an applicant to perform an IPA which consists of screening plant SSCs that are ITLR, identifying those structures and components that could be subject to ARDUTLR, and demonstrating that ARDUTLR would be managed during the period of extended operation. SSCs with aging assessment based on time-limited analyses corresponding to the current operating term, i.e., 40 years, would be treated as having ARDUTLR. The IPA would be included in a final safety analysis report (FSAR) supplement.

Alternative 2 would share a similar IPA framework as the existing rule but would be simplified, including the elimination of the terms ARDUTLR and ITLR. Most SSCs subject to the maintenance rule or other existing programs would require no further evaluation for license renewal. The focus of Alterative 2 is on long-lived passive non-redundant SSCs and those SSCs with aging

assessment based on time-limited analyses in the CLB. Although the IPA would be a part of the application, Alternative 2 would only require the results and conclusions of the IPA be included in a FSAR supplement.

Alternative 3 would rely on the current regulatory process including the maintenance rule and existing programs to address aging, and would only require a re-evaluation of aging assessment based on time-limited analyses corresponding to the current operating term, i.e., 40 years. An extension of these analyses to the end of the period of extended operation, e.g., 60 years, would be required. An IPA is not required and the existing FSAR updating requirements apply when a time-limited analysis described in the FSAR is revised.

A summary comparison of the main features between the various alternatives is shown below:

Table 1 Brief Comparison of License Renewal Alternatives

	Alternative 1	Alternative 2	Alternative 3
Evaluation:			
Active SSCs	Evaluation if subject to ARDUTLR	No evaluation but reliance on regulatory process and existing programs	No evaluation but reliance on regulatory process and existing programs
Passive SSCs	Evaluation if subject to ARDUTLR	Evaluation if long-lived and non-redundant	No evaluation but reliance on regulatory process and existing programs
Time-Limited Analyses	Evaluation	Evaluation	Evaluation
Documentation:			
IPA	Entire IPA in FSAR supplement	IPA results and conclusions in FSAR supplement	Not applicable

Based on the results of the workshop, the no action alternative (Alternative 1) does not give sufficient credit to existing licensee programs. The existing license renewal rule is not explicit in how an applicant can rely on the maintenance rule and other existing licensee activities and programs for purposes of license renewal. Portions of the statements of consideration (SOC) accompanying the existing rule have been viewed to be inconsistent with the NRC staff guidance discussed in SECY-93-049 and SECY-93-113 (References 2

and 3). In addition, the industry does not believe the existing rule provides a stable and predictable regulatory process for license renewal. As discussed in SECY-93-331 (Reference 12), although the NRC staff believes that the existing rule could be implemented to emphasize reliance on existing programs, a rule change would more clearly establish the Commission's expectations for carrying out a license renewal evaluation.

Alternatives 2 and 3 are discussed further in this regulatory analysis.

3. ESTIMATION AND EVALUATION OF VALUES AND IMPACTS

The estimation and evaluation of values and impacts discussed below are based on a comparison with the no action alternative, i.e., continue to implement the existing license renewal rule. The NRC staff has reviewed the details used in deriving the regulatory analysis for the existing rule (Reference 15) and has developed the present regulatory analysis based on an estimation of the differences in requirements between the various alternatives. The estimates of values and impacts, and the differences therein among the alternatives, are believed to reflect actual differences among the various alternatives. The NRC staff has used the review of the detailed evaluations of the existing rule's regulatory analysis together with the knowledge of the requirements of the alternative rules to estimate the values and impacts for the proposed alternatives. Consistent with Reference 15, it is not expected that the cost and radiation exposure estimates in the present regulatory analysis would correspond in specific detail to any renewal application.

Costs attributable to the maintenance rule are excluded from the following evaluation because the maintenance rule is an existing requirement for all licensees that must be implemented by July 10, 1996. Similarly, costs attributable to the current regulatory process and existing programs are excluded because these activities are independent of license renewal requirements.

The NRC staff made a major assumption in evaluating the accident risk associated with Alternative 3. Alternative 3 relies on the current regulatory process to manage aging during the period of extended operation, except for aging issues addressed by time-limited analyses. The NRC staff did not include all aging management activities resulting from future regulatory actions in estimating averted risk for Alternative 3. This is because the extent of future activities has not been determined. Although the NRC staff believes that the current regulatory process could address aging effects of SSCs during the period of extended operation, the NRC staff believes it appropriate and conservative not to include aging management activities that may or may not occur in estimating averted risk during the extended period of operation. As future regulatory actions are implemented through the current regulatory process, the associated aging management activities could be considered for managing the effects of aging during the period of extended operation. If the Commission at that time decides that the specific regulatory actions are adequate in maintaining the function of an equipment during the period of extended operation, the Commission may amend Part 54 to exclude that particular equipment from evaluation in a renewal application.

There may be SSCs that are determined to be in a degraded state potentially not permitted by the CLB and are not routinely repaired or replaced. Consistent with Reference 15, costs associated with analysis, diagnostics, repair, and/or replacement of these degraded SSCs are not included in the present regulatory analysis. These costs are considered to be part of a utility's normal responsibility to ensure that its plant is safe and in sound operating condition.

The cost estimates in the present regulatory analysis are based on 1991 dollars because the cost estimates in Reference 15 were based on 1991 dollars. Consistent with Reference 15, continuing operation costs are presented on a present-worth basis based on a 5 percent real discount rate and the values and impacts are discussed on a per plant basis.

The present regulatory analysis quotes the numerical estimates in Reference 15 to provide traceability between the present regulatory analysis and that prepared for the existing license renewal rule (Reference 15). However, the latest NRC staff's regulatory analysis guidance (Reference 16) recommends certain attribute evaluation bases, such as the discount rate, that are different from those used in Reference 15. In order to be consistent with Reference 16, Section 4 in the present regulatory analysis first presents a summary of values and impacts based on Reference 15 and 1991 dollars (Table 4). Then, Section 4 presents a second version of that summary after adjusting the attribute values to be consistent with Reference 16 and 1993 dollars (Table 5).

In accordance with NRC staff guidance in Reference 16, the following attributes are evaluated in the present regulatory analysis (those identified with an asterisk are similarly affected by the existing rule and proposed alternatives, hence resulting in no change):

public health (accident)
public health (routine)*
occupational health (accident)
occupational health (routine)
offsite property
onsite property
industry implementation
industry operation
NRC implementation
NRC operation
other government*
general public*
improvement in knowledge*
regulatory efficiency
antitrust considerations*
safeguards and security considerations*

The attribute of offsite property is included in the attribute of public health (accident) in accordance with Reference 16. The NRC staff has prepared a separate environmental assessment with this proposed action.

Quantification of values for each of the proposed alternative rules is discussed in Section 3.1. Section 3.2 discusses impacts.

3.1 Estimation of Values

This section presents estimates of the values (changes in public health, occupational health, and offsite property) associated with each of the proposed alternative rules. The existing license renewal rule is used as the baseline.

3.1.1 Alternative 2

3.1.1.1 Public Health (Accident)

The averted accident consequences are evaluated based on the estimate presented in the regulatory analysis accompanying the existing license renewal rule (Reference 15). Tables 4.3 and 4.4 in Reference 15 show the increase in core damage frequency for pressurized water reactors (PWRs) and boiling water reactors (BWRs) during the period of extended operation due to aging of active and passive SSCs, assuming continuation of plant practices prior to the enactment of the existing license renewal rule, and assuming no changes in the then-current aging management activities. Reference 15 lists the active equipment that contributes to the system unavailability contributor to risk, and the passive equipment that contributes to accident initiation. For convenience, Tables 4.3 and 4.4 in Reference 15 are summarized as follows:

Table 2 Dominant SSC Contributors to Increase in Core Damage Frequency Due to Aging During Period of Extended Operation Assuming Pre-License Renewal Rule Aging Management Activities for PWRs and BWRs (Reference 15)

SSCs	Increase in Core Damage Frequency (per reactor year)	
	PWRs	BWRs
Active	9.4×10^{-4}	1.5×10^{-4}
Passive	1.3×10^{-3}	7.6×10^{-4}

Table 4.5 in Reference 15 shows the estimates of averted accident consequences associated with the existing license renewal rule with the risk in Table 2 completely mitigated by the rule requirements. For convenience, Table 4.5 in Reference 15 is summarized as follows:

Table 3 Summary of Averted Accident Consequences Per Plant Over a 20-Year Period of Extended Operation for Existing License Renewal Rule (Reference 15)

Attribute	Estimated Values/Impacts
Values:	
Public Health (Accident)	30,000 person-rem
Occupational Health (Accident)	1,400 person-rem
Impact:	
Onsite Property	$24 million

As discussed in Reference 15, there are large uncertainties associated with these results. The results in Tables 2 and 3 are best estimates. The source of uncertainties includes limitations in the risk interaction model, lack of aging rate data, and uncertainties in the effectiveness of aging management activities. As discussed in Reference 15, the risk of core damage may be increased by a factor of 15 or decreased by a factor of 40 as compared with the best estimate based on a sensitivity analysis.

Alternative 2 relies on the current regulatory process including maintenance rule programs and existing programs to manage aging of all SSCs, except for long-lived passive non-redundant SSCs. The maintenance rule requires that licensees establish goals and monitor the performance or condition of important SSCs to reasonably assure functional capability. The implementation of the maintenance rule will be verified through the existing NRC inspection process. Active SSCs are amenable to performance and condition monitoring in order to assess their functionality. Further, component failures due to aging are "preventable" by adequate maintenance. Consistent with the regulatory analysis accompanying the maintenance rule, maintenance "preventable" failures are mitigated by activities associated with the maintenance rule. The NRC staff believes that active SSCs would be addressed by the current regulatory process including maintenance rule and existing programs, and thus, the risk associated with active SSCs in Table 2 would be mitigated regardless of license renewal alternatives.

Alternative 2 would require aging assessment of long-lived passive non-redundant SSCs for license renewal. The aging of other passive SSCs would continue to be addressed by the current regulatory process. For example, there would be precursors to aging degradation affecting the functionality of redundant passive SSCs and the current regulatory process ensures that appropriate corrective actions will be taken.

Further, there are aging issues which have been evaluated with time-limited analyses as part of the CLB. Alternative 2 would require an extension of these time-limited analyses to the end of the period of extended operation, e.g., 60 years. The existing rule would also require such a re-evaluation under the existing definition of ARDUTLR. The NRC staff performed a

preliminary review to identify time-limited analyses and found that they relate mostly to long-lived passive SSCs. Some examples of time-limited analyses are: the fracture toughness of reactor vessel materials due to neutron irradiation, metal fatigue, environmental qualification (EQ) of electrical equipment, and inservice flaw assessment. Metal fatigue and EQ have been identified as current issues and are being addressed separately (Reference 17). The resolution of these current issues would be carried forward into the period of extended operation.

Alternative 2 would explicitly address certain important long-lived passive SSCs. Thus, the risk in Table 2 associated with passive SSCs would be mitigated.

Based on the above discussion, the averted accident consequences for Alternative 2 are estimated to be well within the range of uncertainties for the existing license renewal rule. The best estimate for Alternative 2 is the same as the existing rule. Thus, public health (accident) for Alternative 2 is the same for the existing rule. This includes the attribute of offsite property (Reference 16).

3.1.1.2 Occupational Health (Accident)

As discussed in Section 3.1.1.1, the averted accident consequences for Alternative 2 are estimated to be similar to those for the existing license renewal rule. Thus, the value of the attribute of occupational health (accident) for Alternative 2 is the same as for the existing rule.

3.1.1.3 Occupational Health (Routine)

Aging management activities may be required for license renewal during plant operation in the renewal term under the existing rule and Alternative 2. It has been estimated that the inspection, surveillance, testing, and monitoring activities required by the existing rule would result in an increase in occupational radiation exposure of 340 person-rem per plant over the period of the renewed license (Reference 15). Alternative 2 would screen in only long-lived passive non-redundant SSCs as requiring further evaluation for license renewal. Aging management activities for the other SSCs would remain under the current regulatory process, including maintenance rule and existing programs, and are not requirements for license renewal.

The NRC staff reviewed the aging management activity enhancements for license renewal considered in the cost and radiation exposure estimates in the regulatory analysis for the existing rule (Appendix D in Reference 15). The NRC staff estimates that about half of these activities address long-lived passive SSCs. Thus, the NRC staff estimates that the incremental exposure involved with Alternative 2 is somewhere between 40 to 60 percent of the existing rule. The best estimate within this range is 50 percent. This results in a decrease of 170 person-rem in occupational health (routine) under Alternative 2 when compared with the existing rule.

3.1.2 Alternative 3

3.1.2.1 Public Health (Accident)

Alternative 3 would rely on the current regulatory process, including the maintenance rule and existing programs, to manage aging of SSCs during the current term and the period of extended operation. Similar to the discussion relating to Alternative 2, active SSCs would be addressed by the maintenance rule and existing programs, and thus, the risk associated with active SSCs in Table 2 would be mitigated.

Alternative 3 would not require an explicit assessment of long-lived passive SSCs for license renewal. However, similar to Alternative 2, Alternative 3 would require an extension of time-limited analyses to the end of the period of extended operation, e.g., 60 years. As discussed in Section 3.1.1.1, many of the long-lived passive SSCs have underlying time-limited analyses which would be re-evaluated under Alternative 3.

As listed in Tables 4.3 and 4.4 in Reference 15, the passive SSCs that are dominant contributors to risk due to age-related degradation are: connectors, piping, cable, reactor pressure vessel internals, bolts on primary and secondary side components, snubbers, and reactor pressure vessel. Also, steam generator tubes are a dominant contributor for PWRs. Most of these SSCs are subject to inservice inspection and testing. Aging management programs for these SSCs are being enhanced through the current regulatory process, making the assumption in Reference 15 of no changes in current programs no longer valid. Most of these long-lived passive SSCs will be subject to the maintenance rule. Further, recent regulatory activities are addressing aging of these SSCs. For example: Generic Letter 92-01 addressed the reactor vessel (Reference 20), Information Notice 93-79 addressed reactor vessel internals (Reference 21), Generic Safety Issue (GSI) 29 addressed bolting (Reference 22), GSI 113 addressed snubbers (Reference 23), NUREG-1477 addressed steam generator tubing (Reference 24), and NRC staff's current action plans address metal fatigue and EQ (Reference 17). Further, ongoing American Society of Mechanical Engineers (ASME) Code Section XI activities are developing additional inservice inspection requirements for reactor vessel internals.

The NRC staff believes that the current regulatory process could address aging effects of SSCs during the period of extended operation under Alternative 3. However, as discussed in Section 3, the NRC staff is excluding aging management activities resulting from future regulatory actions in estimating averted risk for this alternative. While it is conservative in estimating averted risk to exclude aging management activities whose extent has not been determined for the extended period of operation, the NRC staff believes this an appropriate assumption for this analysis.

As discussed in Section 3.1.1.1, there are large uncertainties and the risk of core damage may be increased by a factor of 15 or decreased by a factor of 40 as compared with the best estimate based on a sensitivity analysis (Reference 15). Nonetheless, the NRC staff used the best estimate to

quantitatively compare the values between Alternative 3 and the existing rule in the following calculation. The NRC staff is not implying through this calculation that there is great accuracy or precision in risk estimates.

The NRC staff reviewed the core damage estimates due to aging of individual passive SSCs presented in the regulatory analysis of the existing rule (Appendix C in Reference 15). After considering recent regulatory activities and the license renewal requirement to re-evaluate time-limited analyses, the NRC staff estimates that somewhere between 25 to 75 percent of the risk resulting from long-lived passive SSCs in Table 2 remains if Alternative 3 is implemented. The best estimate within this range is 50 percent. Relative to the existing rule, this results in an increase in core damage frequency per reactor year due to aging during the period of extended operation of 6.5×10^{-4} for PWRs and 3.8×10^{-4} for BWRs. Because 65 percent of the plants are PWRs, the average increase in core damage frequency per reactor year is 5.6×10^{-4} for the combined population of PWRs and BWRs.

Table 3 gives the averted accident consequences for the existing rule. In estimating the averted accident consequences for Alternative 3, the NRC staff linearly proportioned the values in Table 3 based on the core damage frequency estimate for Alternative 3 relative to that for the existing rule. Table 3 is based on an average decrease in core damage frequency per reactor year of 1.8×10^{-3} for PWRs and BWRs achieved with the existing license renewal rule. The ratio of 5.6×10^{-4} to 1.8×10^{-3} is 0.31. Thus, the likelihood of a severe accident for Alternative 3 is 31 percent higher than that for the existing rule, and the risk reduction benefit is 69 percent of that estimated to be achieved with the existing rule. The differences in averted accident consequences between Alternative 3 and the existing rule are 31 percent of the values and impacts shown in Table 3. The accident consequences of Alternative 3 could result in an increase in public exposure of 9,300 person-rem and an increase in occupational exposure of 430 person-rem for the period of extended operation, as compared with the existing rule.

Based on the above discussion, based on the best estimate, there is an increase of 9,300 person-rem in public health (accident) for Alternative 3 as compared with the existing rule. The monetary valuation of this public exposure also accounts for the attribute of offsite property impacted by reactor accidents (Reference 16).

3.1.2.2 Occupational Health (Accident)

As discussed in Section 3.1.2.1, there is an increase of 430 person-rem in occupational health (accident) for Alternative 3 as compared with the existing rule.

3.1.2.3 Occupational Health (Routine)

Aging management activities for license renewal may be required during plant operation in the renewal term under the existing rule. As discussed in Section 3.1.1.3, activities required by the existing rule would result in an increase in occupational radiation exposure of 340 person-rem per plant (Reference 15). Alternative 3 does not require aging management of SSCs as

described in the existing rule but would rely on the current regulatory process. Alternative 3 only requires re-evaluation of time-limited analyses in accordance with the CLB. Aging management activities in response to the current regulatory process, such as the maintenance rule and existing programs are part of the CLB and are not license renewal requirements.

Thus, there is a decrease of 340 person-rem in occupational health (routine) under Alternative 3 when compared with the existing rule.

3.2 Estimation of Impacts

This section presents estimates of the impacts (changes in onsite property, industry implementation, industry operation, NRC implementation, NRC operation, and regulatory efficiency) associated with each of the proposed alternative rules. The existing license renewal rule is used as the baseline.

3.2.1 Alternative 2

3.2.1.1 Onsite Property

Table 3 shows an averted onsite property impact of $24 million under the existing rule. This attribute represents the averted accident-related cleanup and decontamination costs and costs for replacement energy due to extended or permanent plant shutdown. As discussed in Section 3.1.1.1, the averted accident consequences for Alternative 2 are estimated to be similar to those for the existing license renewal rule. Thus, the value of the attribute of onsite property for Alternative 2 is the same as for the existing rule.

3.2.1.2 Industry Implementation

Exemptions and reliefs are required to be reviewed under the existing rule to re-evaluate those that are bounded by the 40-year term. This review effort has been estimated to cost $0.13 million (Reference 15). Alternative 2 has eliminated the requirement to review reliefs from the requirements because the reliefs are based on a 10-year term. The need to review exemptions remains. The NRC staff estimates that the effort involved with Alternative 2 is somewhere between half and three-quarters that of the existing rule. The best estimate within this range is two-thirds. Thus, the cost saving under Alternative 2 when compared with the existing rule is $0.04 million.

The effort to provide updated CLB information to the NRC while a renewal application is under review by the NRC is the same for Alternative 2 and the existing rule.

The existing rule requires the screening of SSCs that meet certain ITLR criteria and the identification of structures and components that perform ITLR functions. All plant SSCs have to be screened for the ITLR criteria. Then, all structures and components within the ITLR SSCs have to be reviewed to identify any relevant ITLR functions that they perform. This effort has been estimated to cost $1.2 million (Reference 15). Alternative 2 would require the screening of systems and structures that meet the same criteria as the existing rule. However, Alternative 2 would focus on long-lived passive non-

redundant SSCs. Alternative 2 has a conceptually simpler screening compared with the existing rule because active, short-lived, and redundant SSCs would be excluded from license renewal evaluation. However, active SSCs have to be screened to identify any passive functions. Further, the screening for redundancy is potentially complicated. For example, pipe segments within a system may have to be screened one at a time to identify redundancy. The NRC staff estimates that the screening effort under Alternative 2 is similar to that of the existing rule.

Aging assessments and the establ[illegible]nt of aging management programs for license renewal are required by [illegible]isting rule and Alternative 2. However, the existing rule is focussed on ag[illegible]g mechanisms and Alternative 2 is focussed on aging effects on SSC functionality. Addressing aging mechanisms may be labor intensive and may be viewed by some as conducting a research project. The change of focus to aging effects would reduce the level of effort. In addition, Alternative 2 would have a smaller scope, i.e., long-lived passive non-redundant SSCs, compared t[illegible] existing rule. The effort to perform the aging assessments and establi[illegible]ng management programs under the existing rule has been estimated to be $[illegible] million (Reference 15). Out of this amount, $1.8 million has been estimated to be associated with the continual effort to assess aging during plant operation in the renewal term (Reference 15). Thus, the amount associated with the initial implementation is $11.5 million. Although the scope of SSCs is less in Alternative 2, it addresses SSCs whose functionality may be difficult to determine based on performance monitoring. Enhanced aging management programs may be required and new monitoring techniques may need to be developed. In addition, time-limited analyses would need to be re-evalu[illegible] The NRC staff estimates that the effort involved with Alternative 2 is s[illegible] where between 50 to 75 percent that of the existing rule. The best estimate within this range is 60 percent. Thus, the cost saving under Alternative 2 when compared with the existing rule is $4.6 million.

Data base programs may have to be established for license renewal to support aging assessments in accordance with the existing rule and Alternative 2. This effort is expected to be similar under the existing rule and Alternative 2.

3.2.1.3 Industry Operation

Documentation has to be maintained during plant operation. The existing rule requires submitting the IPA as an FSAR supplement. The existing rule could result in many aging management programs, including those implemented in response to the maintenance rule and existing programs, being described in the FSAR. Programs in the FSAR have documentation requirements to control changes. The existing rule also has requirements to update the list of SSCs that are ITLR. The regulatory analysis for the existing rule (Reference 15) estimated the continuing documentation effort to have a present value of $0.4 million. The NRC staff expects that Alternative 2 would result in fewer aging management programs being listed in the FSAR. This is because Alternative 2 would separate the IPA from the FSAR supplement. However, aging management programs for long-lived passive non-redundant SSCs may be referenced in the FSAR supplement. The NRC staff estimates that the effort

involved with Alternative 2 is somewhere between 10 and 30 percent that of the existing rule. The best estimate within this range is 20 percent. Thus, the documentation-related cost saving under Alternative 2 when compared with the existing rule is $0.32 million.

Aging assessments for license renewal may have to be continued during plant operation to provide periodic updates of SSC status. As discussed in Section 3.2.1.2, this effort has been estimated to be $1.8 million for the existing rule. As also discussed in Section 3.2.1.2, the NRC staff estimates that 60 percent of the aging assessment cost for the existing rule would be applicable to Alternative 2. Thus, the cost saving under Alternative 2 when compared with the existing rule is $0.72 million.

Data base programs may have to be maintained for license renewal during plant operation to assist in the aging assessment of SSCs. The regulatory analysis for the existing rule (Reference 15) estimated that this continuing data collection effort to have a present value of $3.0 million. Alternative 2 would focus on long-lived passive non-redundant SSCs. Further, data collection activities under the maintenance rule and existing programs should be useful in assessing the condition of SSCs. As discussed in Section 3.1.1.3, the NRC staff estimates that the effort involved with Alternative 2 is 50 percent that of the existing rule. Thus, the cost saving under Alternative 2 when compared with the existing rule is $1.5 million.

Aging management activities may be required for license renewal during plant operation in the renewal term under the existing rule and Alternative 2. It has been estimated that the inspection, surveillance, testing, and monitoring activities required by the existing rule would cost $9.3 million (Reference 15). Alternative 2 would focus on long-lived passive non-redundant SSCs. Aging management activities under the maintenance rule and existing programs would remain within the CLB. As discussed in Section 3.1.1.3, the NRC staff estimates that the effort involved with Alternative 2 is 50 percent that of the existing rule. Thus, the cost saving under Alternative 2 when compared with the existing rule is $4.7 million.

3.2.1.4 NRC Implementation

Exemptions and reliefs are required to be reviewed under the existing rule. This effort is estimated to be $0.09 million based on costs in Reference 15. As discussed in Section 3.2.1.2, the NRC staff estimates that the effort involved with Alternative 2 is two-thirds that of the existing rule. Thus, the cost saving under Alternative 2 when compared with the existing rule is $0.03 million.

Aging assessments and the establishment of aging management programs for license renewal are required by the existing rule and Alternative 2. It has been estimated in Reference 15 that the associated NRC staff review resource is $0.3 million for the existing rule. As discussed in Section 3.2.1.2, the NRC staff estimates that the effort involved with Alternative 2 is 60 percent that of the existing rule. Thus, the cost saving under Alternative 2 when compared with the existing rule is $0.12 million.

Aging management activities for license renewal may be reviewed by the NRC staff under the existing rule and Alternative 2. This effort has been estimated to be $0.2 million for the existing rule (Reference 15). As discussed in Section 3.2.1.3, the NRC staff estimates that the effort involved with Alternative 2 is 50 percent that of the existing rule. Thus, the cost saving under Alternative 2 when compared with the existing rule is $0.1 million.

The NRC staff will complete developing the Standard Review Plan for License Renewal (Reference 18) and Regulatory Guide (Reference 19) to provide guidance addressing the requirements in the rule amendment. Draft guidance documents were developed for the existing rule. However, these draft documents will be revised even under the existing license renewal rule. Thus, this effort is expected to be similar under the existing rule and Alternative 2.

The NRC staff will expend resources to amend the license renewal rule under either Alternative 2 or 3. However, this effort should be more than offset by having a rule that is clearer than the present rule and one that requires less interpretation. The NRC will take on burden to defend the rule amendment if challenged in court. However, as discussed in Section 3.2.1.6, the risk of a rule challenge should not be significant with Alternative 2.

3.2.1.5 NRC Operation

Documentation has to be maintained during plant operation. The effort required under the existing rule is estimated to be $0.28 million based on costs in Reference 15. As discussed in Section 3.2.1.3, the NRC staff estimates that the effort involved with Alternative 2 is 20 percent that of the existing rule. Thus, the cost saving under Alternative 2 when compared with the existing rule is $0.22 million.

Aging management activities for license renewal during plant operation in the renewal term may be reviewed by the NRC staff under the existing rule and Alternative 2. This effort has been estimated to be $1.6 million for the existing rule (Reference 15). As discussed in Section 3.2.1.3, the NRC staff estimates that the effort involved with Alternative 2 is 50 percent that of the existing rule. Thus, the cost saving under Alternative 2 when compared with the existing rule is $0.8 million.

3.2.1.6 Regulatory Efficiency

The proposed amendment of Part 54 would provide a more stable and predictable regulatory environment. The existing license renewal rule is difficult to implement largely because of the existing rule language and its interpretation. Portions of the SOC accompanying the existing rule have been viewed to be inconsistent with the NRC staff guidance discussed in SECY-93-049 and SECY-93-113 (References 2 and 3). The proposed amendment would clarify the rule language and would be accompanied by a new SOC that is supportive of the rule amendment.

A clarified rule would enable licensees to better understand the Commission's expectations relating to license renewal requirements. This would permit the

licensees to make informed decisions with respect to the license renewal option. Further, a clarified rule would be subject to less debate between the NRC staff and a license renewal applicant regarding rule requirements and thus, should reduce the NRC's review time.

Alternative 2 represents a change to the existing license renewal rule based on additional NRC staff experience and continual enhancement of the current regulatory process such as the promulgation of the maintenance rule. There is always some risk that an amended rule may not be upheld in court when challenged. Even though the NRC staff believes the rule amendment is substantial, the NRC staff expects the risk associated with amending the rule based on Alternative 2 to be small because the framework of the existing rule is retained.

3.2.2 Alternative 3

3.2.2.1 Onsite Property

Table 3 shows an averted onsite property cost of $24 million achieved through the imposition of the existing rule. As discussed in Section 3.1.2.1, the increase in accident consequences for Alternative 3 relative to the existing rule is 31 percent of those in Table 3. Thus, the increase in the onsite property cost under Alternative 3 as compared with the existing rule is $7.4 million.

3.2.2.2 Industry Implementation

Exemptions and reliefs are required to be reviewed under the existing rule in order to re-evaluate those that are bounded by the 40-year term. This effort has been estimated to cost $0.13 million (Reference 15). Alternative 3 would only require a re-evaluation of time-limited analyses based on 40 years. Reliefs are based on 10-year terms and would not be subject to additional reviews under Alternative 3. Any exemptions granted based on a time-limited analysis would automatically be within the scope of Alternative 3. Alternative 3 would not contain a separate requirement for exemptions and reliefs. Thus, the cost saving under Alternative 3 when compared with the existing rule is $0.13 million.

The effort to provide updated CLB information to the NRC while a renewal application is under review by the NRC based on the existing rule is estimated to be $0.12 million based on costs in Reference 15. Alternative 3 would only address time-limited analyses. A licensee would only need to update changes in time-limited analyses. The NRC staff estimates the effort involved with Alternative 3 is somewhere between 0 and 10 percent that of the existing rule. The best estimate within this range is 5 percent. Thus, the cost saving under Alternative 3 when compared with the existing rule is $0.11 million.

The existing rule requires the screening of SSCs that meet certain ITLR criteria and the identification of structures and components that perform ITLR functions. This effort has been estimated in Reference 15 to cost $1.2 million. Under Alternative 3, it is unnecessary to screen for ITLR SSCs and only structures and components that perform ITLR functions.

Alternative 3 would require only the identification of time-limited analyses existing in the plant's CLB. The level of effort under Alternative 3 is significantly less than that in the existing rule. A preliminary review by the NRC staff indicated that there may be less than a dozen time-limited analyses at a plant based on its specific CLB. The NRC staff estimates that the effort to identify time-limited analyses is somewhere between 2.5 percent and 7.5 percent that of the screening effort in the existing rule. The best estimate within this range is 5 percent. Thus, the cost saving under Alternative 3 when compared with the existing rule is $1.1 million.

Aging assessments and the establishment of aging management programs for license renewal are required by the existing rule. As discussed in Section 3.2.1.2, this effort is estimated to cost $11.5 million. Alternative 3 does not require aging assessments as described in the existing rule but would rely on the current regulatory process including maintenance rule and existing programs. Alternative 3 only requires the re-evaluation of time-limited analyses in the CLB. However, many technically challenging aging issues have been based on time-limited analyses. The NRC staff estimates that the effort to re-evaluate time-limited analyses is somewhere between 5 and 15 percent of that for the aging assessments of the existing rule. The best estimate within this range is 10 percent. Thus, the cost saving under Alternative 3 when compared with the existing rule is $10.4 million.

Data base programs may have to be established for license renewal to allow for aging assessments in accordance with the existing rule. It has been estimated in Reference 15 that this effort would cost $0.5 million. Alternative 3 does not require aging assessments as described in the existing rule but would rely on the current regulatory process including the maintenance rule and existing programs. It is not necessary to collect data beyond the existing practice. Thus, the cost saving under Alternative 3 when compared with the existing rule is $0.5 million.

3.2.2.3 Industry Operation

Documentation has to be maintained during plant operation. As discussed in Section 3.2.1.3, the existing rule has documentation requirements for changes in aging management programs described in the FSAR. Alternative 3 requires re-evaluating time-limited analyses to address the extended period of operation. These time-limited analyses are part of the CLB. Should the licensee decide to change these analyses, existing CLB documentation requirements would apply. Thus, an additional documentation control as described in the existing rule or Alternative 2 is not necessary. The associated documentation cost has been estimated to be $0.4 million for the existing rule in Reference 15. The cost saving under Alternative 3 when compared with the existing rule is $0.4 million.

Aging assessments for license renewal may have to be continued during plant operation to provide periodic updates of SSC status under the existing rule. As discussed in Section 3.2.1.2, this effort has been estimated to be $1.8 million for the existing rule. Alternative 3 does not require aging assessments during plant operation as described in the existing rule because aging assessments in response to the current regulatory process, such as the

maintenance rule and existing programs are part of the CLB and are not license renewal requirements. Alternative 3 only requires re-evaluation of time-limited analyses in the CLB. There is no continuing requirement during plant operation under Alternative 3 outside of activities within the CLB. Thus, the cost saving under Alternative 3 when compared with the existing rule is $1.8 million.

Data base programs for license renewal may have to be maintained during plant operation to assist in the aging assessments of SSCs. The regulatory analysis for the existing rule estimated that this continuing data collection effort has a present value of $3.0 million (Reference 15). Alternative 3 would only require re-evaluation of time-limited analyses and the associated cost has been accounted for in Section 3.2.2.2. There is no continuing data collection effort. However, existing programs would be carried forward into the period of extended operation. An additional data collection program to satisfy license renewal requirements is not necessary. Thus, the cost saving under Alternative 3 when compared with the existing rule is $3.0 million.

Aging management activities for license renewal may be required during plant operation in the renewal term under the existing rule. It has been estimated that these activities required by the existing rule would cost $9.3 million (Reference 15). Alternative 3 does not require aging management of SSCs as described in the existing rule because aging management activities in response to the current regulatory process, such as the maintenance rule and existing programs are part of the CLB and are not license renewal requirements. Alternative 3 only requires re-evaluation of time-limited analyses in the CLB. Thus, the cost saving under Alternative 3 when compared with the existing rule is $9.3 million.

3.2.2.4 NRC Implementation

Exemptions and reliefs are required to be reviewed under the existing rule to re-evaluate those that are bounded by the 40 year term. This effort is estimated to be $0.09 million based on costs in Reference 15. As discussed in Section 3.2.2.2, Alternative 3 would not contain a separate requirement for exemptions and reliefs. Thus, the cost saving under Alternative 3 when compared with the existing rule is $0.09 million.

The existing rule requires the screening of SSCs that meet certain ITLR criteria and to identify structures and components that perform ITLR functions. It has been estimated that the associated NRC staff review resource is $0.17 million under the existing rule (Reference 15). As discussed in Section 3.2.2.2, the NRC staff estimates that the effort to identify time-limited analyses is 5 percent that of the screening effort in the existing rule. Thus, the cost saving under Alternative 3 when compared with the existing rule is $0.16 million.

Aging assessments and the establishment of aging management programs for license renewal are required by the existing rule and Alternative 2. It has been estimated that the associated NRC staff review resource is $0.3 million for the existing rule (Reference 15). As discussed in Section 3.2.2.2, the NRC staff estimates that the effort to re-evaluate time-limited analyses under

Alternative 3 is 10 percent of that for the aging assessments of the existing rule. Thus, the cost saving under Alternative 3 when compared with the existing rule is $0.27 million.

Aging management activities for license renewal may be reviewed by the NRC staff under the existing rule. This effort has been estimated to be $0.2 million for the existing rule (Reference 15). As discussed in Section 3.2.2.3, aging management activities in response to the current regulatory process are part of the CLB and are not license renewal requirements. Thus, the cost saving under Alternative 3 when compared with the existing rule is $0.2 million.

The development of the Standard Review Plan for License Renewal (Reference 18) and the Regulatory Guide (Reference 19) would require less NRC staff resources than under the existing rule. This is because the review focus under Alternative 3 is only time-limited analyses. The NRC staff estimates a cost saving of $5 million based on its experience in developing the draft documents (References 18 and 19). Based on the current industry estimate that 75 percent of the 109 operating plants would be interested in seeking license renewal, this cost saving translates into $0.06 million per plant. Thus, the cost saving under Alternative 3 when compared with the existing rule is $0.06 million.

Similar to the discussion in Section 3.2.1.4, the NRC staff will expend resources to amend the license renewal rule under either Alternative 2 or 3. However, as indicated in Section 3.2.2.6 the risk of a rule challenge may be higher for Alternative 3 than for Alternative 2. This would result in more NRC staff burden in defense of the rule amendment in court.

3.2.2.5 NRC Operation

Documentation has to be maintained during plant operation. The effort required under the existing rule is estimated to be $0.28 million based on costs in Reference 15. As discussed in Section 3.2.2.3, Alternative 3 would not have an additional documentation control as described in the existing rule. Thus, the cost saving under Alternative 3 when compared with the existing rule is $0.28 million.

Aging management activities for license renewal during plant operation in the renewal term may be reviewed by the NRC staff under the existing rule. This effort has been estimated to be $1.6 million for the existing rule (Reference 15). As discussed in Section 3.2.2.3, aging management activities in response to the current regulatory process are part of the CLB and are not license renewal requirements. Thus, the cost saving under Alternative 3 when compared with the existing rule is $1.6 million.

3.2.2.6 Regulatory Efficiency

The proposed amendment of Part 54 would provide a more stable and predictable regulatory environment. Further discussion has been provided in Section 3.2.1.6.

Alternative 3 would result in a much more simplified rule because of its focus on time-limited analyses. In contrary, Alternative 2 would also require an aging assessment of long-lived passive non-redundant SSCs. However, Alternative 3 could be viewed as a more significant change to the license renewal rule as compared with Alternative 2. The NRC staff may still be able to argue that Alternative 3 represents a change to the existing license renewal rule based on additional NRC staff experience and continual enhancement of the current regulatory process, similar to Alternative 2. Nonetheless, risk associated with promulgating a rule amendment based on Alternative 3 may be higher than that for Alternative 2.

There may also be a concern that it would require significantly more time to amend the rule based on Alternative 3 when compared with Alternative 2. However, the NRC staff believes that there could be a similar time schedule for amending the rule based on either Alternative 2 or 3. This is because the arguments to support Alternatives 2 and 3 could be similar. Further, Alternative 2 relies on the current regulatory process including the maintenance rule, except for long-lived passive non-redundant SSCs. This exception, which is absent from Alternative 3, would require additional justification in Alternative 2.

Although the NRC staff believes that Alternative 3 would enhance regulatory efficiency, the NRC staff could not quantify its impact.

3.3 Evaluation of Values and Impacts

The NRC staff has estimated the values and impacts of Alternatives 2 and 3 as compared with the no action alternative, i.e., continue to implement the existing license renewal rule. As discussed in Section 3, the cost estimates are based on 1991 dollars and continuing operation costs are presented on a present-worth basis.

As discussed in Sections 3.1.1.1 through 3.1.1.3, the radiation exposure resulting from Alternative 2 would be similar to that of the existing rule, except for occupational health (routine). Alternative 2 shows a decrease of 170 person-rem. Using a monetary conversion factor of $1,000 per person-rem (Reference 14), the decrease in occupational health (routine) cost is $0.17 million, as compared with the existing rule.

As discussed in Section 3.1.2.1 through 3.1.2.3, the radiation exposures resulting from Alternative 3 as compared with the existing rule are: an increase of 9,300 person-rem for public health (accident), an increase of 430 person-rem for occupational health (accident), and a decrease of 340 person-rem for occupational health (routine). Using a monetary conversion factor of $1,000 per person-rem (Reference 14), the health cost of Alternative 3 compared with the existing rule are: an increase in public health (accident) of $9.3 million, an increase in occupational health (accident) of $0.43 million, and a decrease in occupational health (routine) of $0.34 million.

There are large uncertainties associated with the results (Reference 15). The source of uncertainties includes limitations in the risk interaction model,

lack of aging rate data, and uncertainties in the effectiveness of aging management activities. The results in Sections 3.1 and 3.2 are best estimates based on Reference 15. As discussed in Reference 15, the risk of core damage may be increased by a factor of 15 or decreased by a factor of 40 as compared with the best estimate based on a sensitivity analysis.

4. PRESENTATION OF RESULTS

The values and impacts of Alternatives 2 and 3 as compared with the existing rule have been discussed in Sections 3.1 through 3.3. The results are summarized on a per plant basis as follows:

Table 4 Summary of Estimated Values and Impacts of Alternatives 2 and 3 on a Per Plant Basis Compared with Existing Rule Based on Reference 15 and 1991 Dollars

Attributes	Estimated Values/Impacts ($ million/reactor) Alternative 2	Alternative 3
Values:		
Public Health (Accident)	0	(9.3)
Occupational Health (Accident)	0	(0.4)
Occupational Health (Routine)	0.2	0.3
Impacts:		
Onsite Property	0	(7.4)
Industry Implementation	4.6	12.2
Industry Operation	7.2	14.5
NRC Implementation	0.3	0.8
NRC Operation	1.0	1.9
NET VALUE	13.3	12.6

Table 4 shows best estimate values. The net value for Alternative 2 ranges between $9.6 and 16.3 million per plant. The net value for Alternative 3 ranges between $3.4 and 21.9 million per plant.

A positive net value in Table 4 represents cost savings to the industry, public, and/or NRC. Negative values are shown in parenthesis. All values shown are on a per-plant basis. As discussed in Section 3.3, there are large uncertainties in the results.

Since the publication of Reference 15, the NRC staff has issued additional guidance on conducting a regulatory analysis in Reference 16. Certain attribute values used in Reference 15, such as the discount rate, are not consistent with those recommended in Reference 16. Further, Reference 15 was

based on 1991 dollars. To be consistent with the latest NRC guideline, Table 4 has been adjusted according to the guidance in Reference 16 and to 1993 dollars. The result is as follows:

Table 5 Summary of Estimated Values and Impacts of Alternatives 2 and 3 Compared with Existing Rule Per Plant Based on Reference 15 Adjusted to be Consistent with Reference 16 and Shown in 1993 Dollars

Attributes	Estimated Values/Impacts ($ million/reactor) Alternative 2	Alternative 3
Values:		
Public Health (Accident)	0	(9.3)
Occupational Health (Accident)	0	(0.4)
Occupational Health (Routine)	0.2	0.3
Impacts:		
Onsite Property	0	(8.0)
Industry Implementation	4.4	11.7
Industry Operation	6.1	12.4
NRC Implementation	0.3	0.8
NRC Operation	0.9	1.6
NET VALUE	11.9	9.1

Table 5 shows best estimate values. The net value for Alternative 2 ranges between $8.5 and 14.6 million per plant. The net value for Alternative 3 ranges between $(0.4) and 18.7 million per plant. A positive net value represents cost savings to the industry, public, and/or NRC. Negative values are shown in parenthesis.

The industry currently estimates that about 75 percent of the 109 operating plants would be interested in seeking license renewal. Based on the net values per plant in Table 5, the industry-wide net values are $970 million and $744 million for Alternatives 2 and 3, respectively, as compared with the existing rule.

There are other attributes which have not been quantified. Either Alternative 2 or Alternative 3 would provide for a more stable and predictable regulatory environment by clarifying the language in the rule as discussed in Sections 3.2.1.6 and 3.2.2.6. The NRC staff believes that the existing rule could be amended based on Alternative 2 or 3 on a similar time schedule. However, the risk associated with court challenges to the rule amendment may be higher for Alternative 3 than for Alternative 2.

5. DECISION RATIONALE FOR SELECTION OF THE PROPOSED ACTION

The results in Section 4 above show that Alternatives 2 and 3 have similar significant positive net values when compared with the existing rule. In general terms, the cost of license renewal has been estimated to be about $30 million per plant based on the existing rule (Reference 15). Either Alternative 2 or 3 would save about $10 million per plant. However, as discussed in Section 3.3, there are large uncertainties associated with the results.

Alternative 2 maintains a similar level of public health and safety while Alternative 3 has a potential increase in accident risk, when compared with the existing rule. The risk increase under Alternative 3 results from the NRC staff's conservative assumption that aging management activities in response to future regulatory actions regarding long-lived passive equipment are not included in the averted risk estimate for the extended period of operation. Although the NRC staff believes that the current regulatory process could address aging effects of SSCs during the period of extended operation, the extent of these future activities has not been determined.

The Commission has directed that the NRC staff develop a proposed rule using Alternative 2. The rationale for selecting Alternative 2 is that it would protect the public health and safety similar to the current rule. In addition, the Commission believes that a systematic aging assessment of long-lived passive non-redundant SSCs is warranted for the extended period of operation because of the importance of these SSCs and the potential reduction in the risk to public health. Such an assessment would not be included in Alternative 3. Further, an approach similar to Alternative 2, but retaining the term ARDUTLR, was endorsed by industry organizations that are actively involved in license renewal activities (References 9 and 11).

6. IMPLEMENTATION

The proposed action is to amend Part 54 in accordance with Alternative 2. The schedule for issuing the proposed rule for public comment is June of 1994. The final rule is tentatively scheduled to be issued in January of 1995.

This regulatory action would be applicable only to those applicants that apply for license renewal after the effective date of the final regulation. Because of implementation difficulties with the existing Part 54 rule, it is unlikely that any license renewal application will be submitted before the proposed rule amendment becomes effective.

As future regulatory actions are implemented, the associated aging management activities could be considered for managing the effects of aging during the period of extended operation. If the Commission at that time decides that the specific regulatory actions are adequate in maintaining the function of an equipment during the period of extended operation, the Commission may amend Part 54 to exclude that particular equipment from evaluation in a renewal application.

7. REFERENCES

1. Final Rule on License Renewal, 56 FR 64943, December 13, 1991.

2. "Implementation of 10 CFR Part 54, 'Requirements for Renewal of Operating Licenses for Nuclear Power Plants,'" SECY-93-049, NRC, March 1, 1993.

3. "Additional Implementation Information for 10 CFR Part 54, 'Requirements for Renewal of Operating Licenses for Nuclear Power Plants,'" SECY-93-113, NRC, April 30, 1993

4. NRC Staff Requirements Memorandum from Samuel J. Chilk, dated June 22, 1993.

5. Notice of Public Workshop on License Renewal, 58 FR 42987, August 12, 1993.

6. Letter from Susan L. Hiatt of the Ohio Citizens for Responsible Energy, Inc., to NRC Docketing, dated October 11, 1993.

7. Letter from E. C. Brolin of the U. S. Department of Energy to Samuel J. Chilk of NRC, dated October 12, 1993.

8. Letter from D. W. Edwards of the Yankee Atomic Electric Company to Samuel J. Chilk of NRC, dated October 8, 1993.

9. Letter from William H. Rasin of the Nuclear Management and Resources Council to Samuel J. Chilk of NRC, dated October 12, 1993.

10. Letter from W. L. Stewart of the Virginia Power Company to the Secretary of the Commission of NRC, dated October 12, 1993.

11. Letter from William H. Rasin of the Nuclear Management and Resources Council to Samuel J. Chilk of NRC, dated November 18, 1993.

12. "License Renewal Workshop Results and Staff Proposals for Revision to 10 CFR Part 54, 'Requirements for Renewal of Operating Licenses for Nuclear Power Plants,'" SECY-93-331, NRC, December 7, 1993.

13. NRC Staff Requirements Memorandum from Samuel J. Chilk, dated February 2, 1994.

14. "Regulatory Analysis Guidelines of the U.S. Nuclear Regulatory Commission," NUREG/BR-0058, Revision 2, Draft Report for Comment, August 1993 (58 FR 47159; September 7, 1993).

15. "Regulatory Analysis for Final Rule on Nuclear Power Plant License Renewal," NUREG-1362, December 1991.

16. "Regulatory Analysis Technical Evaluation Handbook," NUREG/BR-0184, Draft Report, August 1993.

17. Letter from William T. Russell of NRC to William Rasin of the Nuclear Management and Resources Council, dated July 30, 1993.

18. "Standard Review Plan for the Review of License Renewal Applications for Nuclear Power Plants," NUREG-1299, Draft Report for Comment, November 1990.

19. "Standard Format and Content of Technical Information for Applications to Renew Nuclear Power Plant Operating Licenses," Draft Regulatory Guide DG-1009, December 1990.

20. "Reactor Vessel Structural Integrity," Generic Letter 92-01, Rev. 1, March 6, 1992.

21. "Core Shroud Cracking at Beltline Region Welds in Boiling-Water Reactors," Information Notice 93-79, September 30, 1993.

22. "Generic Safety Issue 29, 'Bolting Degradation or Failure in Nuclear Power Plants,'" Generic Letter 91-17, October 17, 1991.

23. "Technical Evaluation of Generic Issue 113: Dynamic Qualification and Testing of Large Bore Hydraulic Snubbers," NUREG/CR-5416, September 1992.

24. "Voltage-Based Interim Plugging Criteria for Steam Generator Tubes," NUREG-1477, Draft Report for Comment, June 1993 (58 FR 35985; July 2, 1993).

ENCLOSURE 5

COMPARISON OF CURRENT 10 CFR PART 54

TO

PROPOSED 10 CFR PART 54

WITH

REASONS FOR CHANGE

CURRENT RULE AS WRITTEN IN 10 CFR	PROPOSED RULE - ADDITIONS IN *ITALICS*	REASON FOR CHANGE
§2.758(b)(1) A party to an adjudicatory proceeding involving initial licensing subject to this subpart may petition that the application of a specified Commission rule or regulation or any provision thereof, of the type described in paragraph (a) of this section, be waived or an exception made for the particular proceeding. The sole ground for petition for waiver or exception is that special circumstances with respect to the subject matter of the particular proceeding are such that the application of the rule or regulation (or provision thereof) would not serve the purposes for which the rule or regulation was adopted. The petition must be accompanied by an affidavit that identifies the specific subject matter of the proceeding as to which the application of the rule or regulation (or provision thereof) would not serve the purposes for which the rule or regulation was adopted, and shall set forth with particularity the special circumstances alleged to justify the waiver or exception requested. Any other party may file a response thereto, by counteraffidavit or otherwise.	*§ 2.758(b) A party to an adjudicatory proceeding involving initial or renewal licensing subject to this subpart may petition that the application of a specified Commission rule or regulation or any provision thereof, of the type described in paragraph (a) of this section, be waived or an exception made for the particular proceeding. The sole ground for petition for waiver or exception shall be that special circumstances with respect to the subject matter of the particular proceeding are such that the application of the rule or regulation (or provision thereof) would not serve the purposes for which the rule or regulation was adopted. The petition shall be accompanied by an affidavit that identifies the specific aspect or aspects of the subject matter of the proceeding as to which the application of the rule or regulation (or provision thereof) would not serve the purposes for which the rule or regulation was adopted, and shall set forth with particularity the special circumstances alleged to justify the waiver or exception requested. Any other party may file a response thereto, by counteraffidavit or otherwise.*	Conforming change due to deletion of the term "age-related degradation unique to license renewal". §2.758(b)(1), (b)(2), and (b)(3) are combined into a new §2.758(b)

CURRENT RULE AS WRITTEN IN 10 CFR	PROPOSED RULE - ADDITIONS IN *ITALICS*	REASON FOR CHANGE
§ 2.758(b)(2) A party to an adjudicatory proceeding involving issuance of a renewed license under 10 CFR Part 54 may petition that the requirements applicable to renewed licenses under this title should be waived or an exception made for the particular proceeding. The sole grounds for the petition must be one or both of the following: (i) With respect to the subject matter of the particular proceeding, special circumstances pertaining to age related degradation unique to license renewal (as defined in 10 CFR Part 54) or environmental protection are such that the application of specific requirements of 10 CFR Part 54 or 10 CFR Part 51 in question would not serve the purposes for which the rule or regulation was adopted. The petition must be accompanied by an affidavit that specifies the specific section (or portion thereof) of either 10 CFR Part 54 addressing age-related degradation or 10 CFR part 51 for which a waiver or exception is sought, the subject matter of the proceeding as to which the application of the identified requirement would not serve the purposes for which the rule or regulation was adopted, and must set forth with particularity the special circumstances alleged to justify the waiver or exception requested.	Deleted from proposed rule.	Conforming change due to deletion of the term "age-related degradation unique to license renewal".

CURRENT RULE AS WRITTEN IN 10 CFR	PROPOSED RULE - ADDITIONS IN *ITALICS*	REASON FOR CHANGE
§ 2.758(b)(2) continued (ii) Because of circumstances unique to the requested term that result in: (A) Operation that is inimical to the public health and safety or common defense and security, or (B) Noncompliance with the current licensing basis during the period of extended operation, requirements in addition to those in the plant's current licensing basis or otherwise needed for compliance with 10 CFR section 54.29 must be imposed to provide compliance with the current licensing basis or to ensure that operation is not inimical to the public health and safety or common defense and security during the period of extended operation.	Deleted from proposed rule.	Conforming change due to deletion of the term "age-related degradation unique to license renewal".
§ 2.758(b)(3) Any other party may file a response to a petition submitted pursuant to paragraphs (b)(1) or (2) of this section by counteraffidavit or otherwise.	Deleted from proposed rule.	Conforming change due to deletion of the term "age-related degradation unique to license renewal".
§ 54.3 Definitions. Age-related degradation means a change in a system's, structure's, or component's performance or physical or chemical properties resulting in whole or part from one or more aging mechanisms. Examples of this type of change include changes in dimension, ductility, fatigue resistance, fracture toughness, mechanical strength, polymerization, viscosity, and dielectric strength.	§ 54.3 Definitions. Deleted from proposed rule.	This definition has been deleted from the rule because the term "age-related degradation" does not appear in the text of the proposed rule. Throughout the proposed rule text, references to "aging", "age-related degradation", or "age-related degradation unique to license renewal" have been replaced by reference to "effects of aging" to emphasize the change from managing aging mechanisms to identifying and mitigating aging effects.

CURRENT RULE AS WRITTEN IN 10 CFR	PROPOSED RULE - ADDITIONS IN *ITALICS*	REASON FOR CHANGE
§ 54.3 Definitions: Age-related degradation unique to license renewal is degradation - (1) that occurs during the term of the current operating license but whose effects are different in character or magnitude after the term of the current operating license (the period of extended operation); or (2) Whose effects were not explicitly identified and evaluated by the license for the period of extended operation and the evaluation found acceptable by the NRC; or (3) That occurs only during the period of extended operation.	§ 54.3 Definitions. Deleted from proposed rule.	This definition has been deleted from the rule because the term "age-related degradation unique to license renewal" does not appear in the text of the proposed rule.
§ 54.3 Definitions. Aging mechanisms are the physical or chemical processes that result in degradation. These mechanisms include but are not limited to fatigue, erosion, corrosion, erosion/corrosion, wear, thermal embrittlement, radiation embrittlement, microbiologically induced effects, creep, and shrinkage.	§ 54.3 Definitions. Deleted from proposed rule.	Definition deleted based on emphasis towards aging effects instead of mechanisms and due to no mention of the term "mechanisms" within the text of the proposed rule. In addition, the definition did not adequately limit aging processes to those being time dependent, recognize that some mechanisms may be beneficial, nor indicate a relationship between aging and performance or condition monitoring.
§ 54.3 Definitions: Effective program (EP) is a documented program to manage age-related degradation unique to license renewal that ensures that a system, structure, or component important to license renewal will continue to perform its required function or will not prevent the performance of a required function during the period of extended operation.	§ 54.3 Definitions. Deleted from proposed rule.	This definition has been deleted from the rule because the term "effective program" does not appear in the text of the proposed rule.

CURRENT RULE AS WRITTEN IN 10 CFR	PROPOSED RULE - ADDITIONS IN *ITALICS*	REASON FOR CHANGE
§ 54.3 Definitions: Integrated plant assessment (IPA) is a licensee assessment that demonstrates that a nuclear power plant facility's systems, structures, and components important to license renewal have been identified and that age-related degradation unique to license renewal will be managed to ensure that the facility's licensing basis will be maintained during the renewal term.	§ 54.3 Definitions: Integrated plant assessment (IPA) is a licensee assessment that demonstrates that a nuclear power plant facility's structures and components *requiring aging management review in accordance with §54.21(a) for license renewal* have been identified and that *the effects of aging on the functionality of such structures and components* will be managed to ensure that the facility's *CLB* will *continue to maintain an acceptable level of safety* during the *period of extended operation*.	This definition has been changed to conform with deletion of the terms "important to license renewal" and "age-related degradation unique to license renewal" in the proposed rule. Added "the effects of aging on the functionality of these systems, structures, and components" to conform with the change of identifying and mitigating the effects of aging instead of managing aging mechanisms. Added "will continue to maintain an acceptable level of safety" in recognition that the CLB is carried forward from the original operating term. "Renewal term" replaced by "period of extended operation" throughout the proposed rule due to the deletion of the definition of "renewal term."
§ 54.3 Definitions: Renewal term means the period of time that is the sum of the additional amount of time beyond the expiration of the operating license that is requested in the renewal application plus the remaining number of years on the operating license currently in effect.	§ 54.3 Definitions: Deleted from proposed rule.	Throughout the proposed rule, "renewal term" has been replaced by "extended period of operation" for simplicity. Therefore, this definition was deleted.

CURRENT RULE AS WRITTEN IN 10 CFR	PROPOSED RULE - ADDITIONS IN *ITALICS*	REASON FOR CHANGE
§ 54.3 Definitions: Systems, structures, and components (SSCs) important to license renewal are: (1) Safety-related SSCs, which are those relied upon to remain functional during and following design basis events (as defined as in 10 CFR 50.49 (b)(1)) to ensure: (i) The integrity of the reactor coolant pressure boundary; (ii) The capability to shut down the reactor and maintain it in a safe shutdown condition; or (iii) The capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposure comparable to the 10 CFR Part 100 guidelines. (2) All non-safety-related SSCs whose failure could directly prevent satisfactory accomplishment of any of the required functions identified in paragraphs (1)(i), (ii), or (iii) of this definition. (3) All SSCs relied on in safety analyses or plant evaluations to demonstrate compliance with the Commission's regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), pressurized thermal shock (10 CFR 50.61), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63). (4) All SSCs subject to operability requirements contained in the facility technical specification limiting conditions for operation.	§ 54.3 Definitions: Deleted from proposed rule. Replaced by §54.4 Scope.	This definition was deleted and new paragraph, §54.4 Scope, created to eliminate the unnecessary term "important to license renewal."
§ 54.3 Definitions Not contained in current rule.	§ 54.3 Definitions: *Time-limited aging analyses, for the purposes of this part, are those licensee calculations and analyses that form the basis for a licensee conclusion regarding the capability of systems, structures, and components within the scope of this part to perform their intended function(s) that:* *(1) Consider the effects of aging; and* *(2) Are based on explicit assumptions defined by the current operating term of the plant.*	This definition added to define the additional issue previously included within the definition of "age-related degradation unique to license renewal."

CURRENT RULE AS WRITTEN IN 10 CFR	PROPOSED RULE - ADDITIONS IN *ITALICS*	REASON FOR CHANGE
§ 54.4 Not contained in current rule. See definition of "Systems, structures, and components (SSCs) important to license renewal" above.	§ 54.4 Scope *(a) Plant* systems, structures, and components *within the scope of this part are:* (1) Safety-related systems, structures, and components, which are those relied upon to remain functional during and following design basis events (as defined as in 10 CFR 50.49 (b)(1)) to ensure the following functions: (i) The integrity of the reactor coolant pressure boundary; (ii) The capability to shut down the reactor and maintain it in a safe shutdown condition; or (iii) The capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposure comparable to the 10 CFR Part 100 guidelines. (2) All nonsafety-related systems, structures, and components whose failure could prevent satisfactory accomplishment of any of the functions identified in paragraphs (a)(1)(i), (ii), or (iii) of this *section*. (3) All systems, structures, and components relied on in safety analyses or plant evaluations to ***perform a function that*** demonstrates compliance with the Commission's regulations for fire protection (10 CFR 50.48), environmental qualification (10 CFR 50.49), pressurized thermal shock (10 CFR 50.61), anticipated transients without scram (10 CFR 50.62), and station blackout (10 CFR 50.63). (4) All systems, structures, and components subject to operability requirements contained in the facility technical specification-limiting conditions for operation. ***(b) The intended functions that these systems, structures, and components must be shown to fulfill in §54.21 are those functions that are the bases for including them within the scope of license renewal as specified in paragraphs (a)(1)-(4) of this section.***	This paragraph added to replace "Systems, structures, and components (SSCs) important to license renewal" (see above). Added "perform a function" to (3) for consistency with the other sub-paragraphs within the scope in addressing functions and to conform with the IPA focus on functionality of systems, structures, and components. Added (b) to define "intended functions" as related to the systems, structures, and components within the scope.

CURRENT RULE AS WRITTEN IN 10 CFR	PROPOSED RULE - ADDITIONS IN *ITALICS*	REASON FOR CHANGE
§ 54.21 Contents of application - technical information. Each application must include a supplement to the final safety analysis report (FSAR) that presents the information required by this part. The FSAR supplement shall contain the following information:	§ 54.21 Contents of application - technical information. Each application must contain the following information:	Decoupled FSAR supplement from the IPA. The FSAR supplement will contain the results and conclusions of the IPA. This enables the IPA to be a one time, non-living document. The requirement for the FSAR supplement now appears in new step §54.21(g), below.

CURRENT RULE AS WRITTEN IN 10 CFR	PROPOSED RULE - ADDITIONS IN *ITALICS*	REASON FOR CHANGE
§ 54.21(a) Integrated plant assessment (IPA). The IPA must: (1) Identify and list the SSCs important to license renewal. (2) From the list required by paragraph (a)(1) of this section, identify the structures and components (SCs) that contribute to the performance of a required function, or could, if they fail, prevent an SSC important to license renewal from performing its required function. (3) For those SCs identified in paragraph (a)(2) of this section, identify the SCs that could have age-related degradation that is unique to license renewal. (4) Describe and justify the methods used in paragraph (a)(1), (a)(2), and (a)(3) of this section. The description must include (1) the specific criteria for determining whether an SSC is important to license renewal; (2) the criteria for evaluating whether an SC is necessary for the performance of a required function; and (3) the technical criteria to be used in determining whether an SC is subject to age-related degradation unique to license renewal. (5) For each SC identified in paragraph (a)(3) of this section, demonstrate that the age-related degradation unique to license renewal: (i) Is addressed through an effective program, or (ii) Need not be addressed in an effective program. (6) Describe the applicable effective programs for each SC identified in paragraph (a)(5)(i) of this section, and demonstrate that these programs will be effective in maintaining the CLB during the period of extended operation. The evaluation of these programs shall include a review of the CLB as appropriate. Effective programs must: (i) Ensure identification and mitigation of age-related degradation unique to license renewal for the SCs identified pursuant to paragraph (a)(3) of this section; and (ii) Contain acceptance criteria against which the need for corrective action will be evaluated, and ensure that timely corrective action will be taken when these acceptance criteria are not met; and (iii) Be implemented by the facility operating procedures and reviewed by the onsite review committee.	§ 54.21(a) *An* integrated plant assessment (IPA). The IPA must: *(1) For those systems and structures within the scope of this part, as delineated in §54.4, identify and list those structures and components subject to an aging management review. Structures and components subject to an aging management review shall encompass those structures and components --* *(i) That perform an intended function, in §54.4, without moving parts or without a change in configuration or properties. These structures and components include, but are not limited to, pressure retaining boundaries, component supports, reactor coolant pressure boundaries, the reactor vessel, core support structures, containment, seismic Category I structures, electrical cables and connections, and electrical penetrations, excluding, but not limited to, pumps (except casing), valves (except body), motors, batteries, relays, breakers, and transistors; and* *(ii) Whose failure would result in loss of intended system or structure function in §54.4(b), during the period of extended operation; and* *(iii) That are not subject to replacement based on a qualified life or specified time period.* *(2) Describe and justify the methods used in paragraph (a)(1) of this section.* *(3) For each structure and component identified in paragraph (a)(1) of this section, demonstrate that the effects of aging will be managed so that the intended function(s) will be maintained for the period of extended operation.*	This change simplifies the IPA to focus on long-lived, non-redundant systems, structures, and components whose functionality is not readily verified through performance or condition monitoring.

CURRENT RULE AS WRITTEN IN 10 CFR	PROPOSED RULE - ADDITIONS IN *ITALICS*	REASON FOR CHANGE
§ 54.21(b) CLB Changes. Identification and justification of any changes in the current licensing basis associated with age-related degradation unique to license renewal.	§ 54.21(b) CLB Changes. Deleted from proposed rule. New §54.21(b) consists of former §54.21(c).	Conforming change due to deletion of "age-related degradation unique to license renewal". Additionally, this requirement was unnecessary due to existing CLB controls in the regulatory process. Renumbering due to deletion of former (b), (c), and (d).
§ 54.21(c) Exemptions. A list of all plant-specific exemptions granted pursuant to 10 CFR 50.12 and reliefs granted pursuant to 10 CFR 50.55a. For those exemptions and reliefs that either were granted on the basis of an assumed service life or period of operation bounded by the original license term of the facility or otherwise relate to SSCs subject to age-related degradation unique to license renewal, an evaluation that justifies the continuation of these exemptions and reliefs for the renewal term must be provided.	§ 54.21(c) Exemptions. Moved to new §54.21(c) as a subset of time-limited analyses.	Combined with time limited analyses in the proposed new §54.21(c), below.
§ 54.21(d) Plant modifications. A description must be provided of any proposed modifications to the facility or its administrative control procedures necessary to ensure that age-related degradation unique to license renewal is adequately managed during the renewal term.	§ 54.21(d) Plant modifications. Deleted from proposed rule.	Safety significant plant modifications are required to be reported to the Commission independent of the license renewal process.
§ 54.21(c) Not included in current rule.	*§ 54.21(c) An evaluation of time-limited aging analyses.* *(1) A list of time-limited aging analyses, as defined in §54.3, must be provided. The applicant shall demonstrate that --* *(i) The analyses remain valid for the period of extended operation; or* *(ii) The analyses have been projected to the end of the period of extended operation; or* *(iii) The effects of aging on the intended function(s) will be adequately managed for the period of extended operation.* (2) A list *must be provided* of all plant-specific exemptions granted pursuant to 10 CFR 50.12. For those exemptions that *are based on time-limited aging analyses, as defined in §54.3, the applicant shall provide* an evaluation that justifies the continuation of these exemptions for the *period of extended operation.*	This step added to address the additional issue previously included within the concept of age-related degradation unique to license renewal. In (2), the requirement for updating reliefs was deleted because of existing controls in § 50.55a.
§ 54.21(d) Not included in current rule.	*§ 54.21(d) An FSAR supplement. The FSAR supplement for the facility must contain a summary description of the programs and activities for managing the effects of aging for the period of extended operation determined by paragraphs (a) and (c) of this section.*	Added to conform with separate application and FSAR supplement.

CURRENT RULE AS WRITTEN IN 10 CFR	PROPOSED RULE - ADDITIONS IN *ITALICS*	REASON FOR CHANGE
§ 54.22 Contents of application - technical specifications. Each application must include any technical specification changes or additions necessary to support operation during the renewal term as part of the renewal application. The technical justification for these changes or additions must be contained in the FSAR supplement submitted to support license renewal.	§ 54.22 Contents of application - technical specifications. Each application must include any technical specification changes or additions necessary to ***manage the effects of aging*** during the ***period of extended operation*** as part of the renewal application. The technical justification for these changes or additions must be contained in the FSAR supplement submitted to support license renewal.	Limited the Technical Specification changes to be included in the renewal application to those necessary to "manage the effects of aging."
§ 54.29 Standards for issuance of a renewed license. A renewed license may be issued by the Commission, up to the full term authorized by § 54.31, bs ~ the following findings: (a) Actions have been identified a... have been or will be taken with respect to age-related degradation unique to license renewal of SSCs important to license renewal, such that there is reasonable assurance that the activities authorized by the renewed license will be conducted in accordance with the current licensing basis, and that any changes made to the plant's current licensing basis in order to comply with this paragraph are otherwise in accord with the Act and the Commission's regulations. (b) Any applicable requirements of Subpart A of 10 CFR Part 51 have been satisfied. (c) Any matters raised under §2.758 have been addressed as required by that section.	§ 54.29 Standards for issuance of a renewed license. *(a)* A renewed license may be issued by the Commission, up to the full term authorized by §54.31 based on the following findings: *(1)* Actions have been identified and have been or will be taken with respect to -- ***(i) Managing the effects of aging, during the period of extended operation on the functionality of structures and components that have been identified to require review in accordance with §54.21(a)(1); and*** ***(ii) Evaluating time-limited aging analyses that have been identified to require review in accordance with §54.21(c);*** such that there is reasonable assurance that the activities authorized by the renewed license will ***continue to*** be conducted in accordance with the CLB, and that any changes made to the plant's CLB in order to comply with this paragraph are otherwise in accord with the Act and the Commission's regulations. *(2)* Any applicable requirements of Subpart A of 10 CFR Part 51 have been satisfied. *(3)* Any matters raised under §2.758 have been addressed.	Changes in (a) conform to deletion of "age-related degradation unique to license renewal" and shift in focus to "effects of aging" and functionality of systems, structures, and components.

CURRENT RULE AS WRITTEN IN 10 CFR	PROPOSED RULE - ADDITIONS IN *ITALICS*	REASON FOR CHANGE
§ 54.29 (continued) Not included in current rule.	§ 54.29 (continued) *(b) The licensee shall comply with the requirements specified in paragraph (b)(2) of this section if the reviews required by §54.21 show that either –* *(1) Aging will cause a loss of function of those structures or components that are reviewed in §54.21(a)(3) so that there is not reasonable assurance during the current license term that licensed activities will be conducted in accordance with the CLB; or* *(2) The time-limited aging analyses reviewed in §54.21(c) are not sufficient to provide reasonable assurance during the current license term that licensed activities will be conducted in accordance with the CLB.* *(c) As determined by paragraph (b)(1) of this section, the licensee shall take measures under its current license to ensure that the intended function of those structures or components will be maintained in accordance with the CLB throughout the term of the current license. The adequacy of the measures for the term of the current license shall not be subject to challenge as part of the renewal review or hearing under Part 54, but may be raised in a petition filed under 10 CFR 2.206.*	Addition of (b) separates issues pertinent to the current operating term as a result of the renewal process from the renewal review.

CURRENT RULE AS WRITTEN IN 10 CFR	PROPOSED RULE - ADDITIONS IN *ITALICS*	REASON FOR CHANGE
§ 54.31 Issuance of a renewed license. (b) A renewed license will be issued for a fixed period of time, which is the sum of the additional amount of time beyond the expiration of the operating license (not to exceed 20 years) that is requested in a renewal application plus the remaining number of years on the operating license currently in effect. The total number of years for any renewal term may not exceed 40 years. (d) A renewed license may be subsequently renewed upon expiration of the renewal term, in accordance with all applicable requirements.	§ 54.31 Issuance of a renewed license. (b) A renewed license will be issued for a fixed period of time, which is the sum of the additional amount of time beyond the expiration of the operating license (not to exceed 20 years) that is requested in a renewal application plus the remaining number of years on the operating license currently in effect. The *term of any renewed license* may not exceed 40 years. (d) A renewed license may be subsequently renewed, in accordance with all applicable requirements.	Conforming change due to deletion of "renewal term."
§ 54.33(b) Each renewed license will be issued in such form and contain such conditions and limitations, including technical specifications, as the Commission deems appropriate and necessary to address age-related degradation unique to license renewal, including such provisions with respect to any uncompleted items of plant modification and such limitations or conditions as the Commission believes are required to ensure that operation during the period of completion of such items will not endanger public health and safety. Other conditions and limitations, including technical specifications, that do not address age-related degradation unique to license renewal continue in effect for the renewed license.	§ 54.33(b) Each renewed license will be issued in such form and contain such conditions and limitations, including technical specifications, as the Commission deems appropriate and necessary to ***help ensure that systems, structures, and components subject to review in accordance with §54.21(a) will continue to perform their intended functions for the period of extended operation. In addition, the renewed license will be issued in such form and contain such conditions and limitations as the Commission deems appropriate and necessary to help ensure that systems, structures, and components associated with any time-limited aging analyses will continue to perform their intended functions for the period of extended operation.***	Conforming changes due to deletion of "age-related degradation unique to license renewal".

CURRENT RULE AS WRITTEN IN 10 CFR	PROPOSED RULE - ADDITIONS IN *ITALICS*	REASON FOR CHANGE
§ 54.33(d) The licensee shall maintain the programs and procedures reviewed and approved by the staff that manage age-related degradation unique to license renewal. A licensee may make changes to previously approved programs and procedures referenced in the renewal application or FSAR without prior Commission approval if the changes are reviewed by the onsite review committee or equivalent and found not to decrease the effectiveness of the management of age-related degradation unique to license renewal of specific systems, structures, or components previously accepted. Changes that do not reduce the effectiveness of previously accepted programs or procedures must be documented in accordance with § 54.37. Proposed changes that decrease the effectiveness of programs or procedures for management of age-related degradation unique to license renewal must be submitted to the NRC and receive NRC approval before implementation.	§ 54.33(d) Deleted from proposed rule. The new §54.33(d) consists of the former §54.33(e).	This paragraph was deleted because the necessary change controls are accomplished by existing requirements pursuant to §50.59.
§ 54.37(b) The FSAR update required by 10 CFR 50.71(e) must include any SSCs newly identified as important to license renewal as a result of generic information, research, or other new information after the renewed license is issued. The update must also identify any SSCs deleted from the list of SSCs important to license renewal. This FSAR update must describe how the age-related degradation unique to license renewal of newly identified SSCs important to license renewal will be effectively managed during the period of extended operation. The update must also be accompanied by a justification for deleting any SSCs previously identified as important to license renewal.	§ 54.37(b) *After the renewal license is issued*, the FSAR update required by 10 CFR 50.71(e) must include any *structures and components* newly identified *that would have been subject to an aging management review in accordance with §54.21* . This FSAR update must describe how the *effects of aging will be managed such that the intended function(s) in §54.4(b) will be effectively maintained during the period of extended operation.*	Conforming changes due to deletion of "age-related degradation unique to license renewal".
§ 54.37(c) The licensee shall submit to the NRC at least annually a list of all changes made to programs for management of age-related degradation unique to license renewal that do not decrease the effectiveness of programs to which the licensee committed and a brief description, including a summary of the safety evaluation of each change. The licensee shall maintain written documentation that provides the basis for concluding that the change does not reduce the effectiveness of these programs.	§ 54.37(c) Deleted from proposed rule.	This paragraph was deleted because the necessary reporting requirements are accomplished by existing requirements pursuant to §50.71.